The Builder.

VOL. XXXII.—No. 1619.

Pall Mall.

HUGE London of to-day is spoken of as a whole, but the life lived at the two ends of it, respectively known as the East end and the West end, is essentially dissimilar, and perhaps the difference is nowhere more strongly marked than between the noise and bustle of the City and the unbusiness-like lounginess of St. James's. The contrasts in London, however, are not confined to those between business and pleasure, and those between poverty and riches, for there are strong differences between the dull respectable streets which consist of little more than dirty brick walls with windows in them, and the picturesque splendours of Pall Mall, which is unquestionably the most architectural street in London. It is to the clubs which now form one of the special features of London life, and which have mostly been erected in the middle of this century, that Pall Mall owes its present magnificent character. It was always a fashionable street, as might be expected when it had a palace at each end, but one of these (Carlton House) has long since disappeared, and the palaces raised for the comfort of our upper and middle classes have quite overshadowed the palaces of our sovereigns. The street is still capable of improvement, and requires (1) the rebuilding of the War Office, (2) the pulling down of the houses to the south of the Thatched House Club, and the opening up of a view of the Green Park through Cleveland-row.

Pall Mall is the loved resort of the lounger and the quidnunc, and there are many who agree in heart with the aspiration of Charles Morris when he sang:—

> "In town let me live, then, in town let me die;
> For in truth I can't relish the country, not I.
> If one must have a villa in summer to dwell,
> Oh! give me the sweet shady side of Pall-mall."

At the end of the sixteenth century Pall Mall did not exist, although a public roadway from Charing-cross to St. James's House or Hospital was of considerable antiquity. To the north of the road were open fields, in one of which was a conduit situated at a spot which would now be the centre of St. James's-square. At the east end of the road there stood previously to the Reformation a group of small monkish buildings belonging to the Westminster monastery; one of these was the Rookery; and the tradition has been handed down that in another a forge was erected for King Henry VI., who attempted to fill his empty coffers by an unsuccessful search for the philosopher's stone. Before these houses were swept away, they had a distinguished inhabitant in Erasmus, who lived there for a time by favour of Henry VIII. At the west end of the road, St. James's Palace, which Henry VIII. built when he abolished the old hospital for lepers, stood nearly alone, and was thoroughly in the country. In 1561, when Queen Elizabeth made a progress from Enfield to London, the hedges along the road from Islington to St. James's were cut down and the ditches filled up, in order to make a way for her to pass.

Either in the time of James I. or in the next reign a portion of the St. James's-fields was laid out for the convenience of the players of the newly-introduced game of pall-mall. Games did not flourish during the years of the Commonwealth, and at the Restoration the courtiers found the Pall Mall less secluded than they left it. In consequence of the road being partly built upon, Charles II. set aside a portion of St. James's Park for the purposes of his favourite game. A game that has not only given its name to the handsomest street in London, and to the once fashionable promenade in St. James's Park, but has also left its mark on our literature, seems to be worthy of some little explanation. At one time most of the principal cities of Europe had their malls; and Evelyn specially mentions those at Blois, Tours, and Lyons; but now the game is nothing but an empty name. The mode of play has so thoroughly escaped us, that in two popular works the representation of a totally different game has been made to do duty for this. From dictionaries and other sources we are able to make out something about it, and Mr. Albert Way printed a paper on the subject in the *Archæological Journal* (vol. xi., 1854), which he illustrated by a figure of a mallet and ball found in the house of the late Mr. Benjamin Vulliamy, at No. 68, Pall-mall, but still it was not clear how the game was played. Dr. R. C. A. Prior, F.L.S., has been so fortunate as to find a curious little French work, published in 1717, and entitled "Le Jeu de Mail, par Joseph Lanthier," from which he has quoted largely in his own interesting "Notes on Croquet; and some Ancient Bat and Ball Games related to it," lately published. James I. mentions pall-mall in his "Basilikon Doron," among other exercises suited for his son Henry; and Sir Robert Dallington, writing in 1598, strongly advocates its introduction into England. The Mall, where the game of pall-mall (from *palla*, a ball, and *maglia*, a mallet) was played, was a long alley sometimes half a mile in length, and usually between rows of tall trees. The ground was made smooth, and prepared with great care, so that the ball should glide along its surface. Each player had a mallet between 3 ft. and 4 ft. in length, and a round box-wood ball of between 2 in. and 3 in. in diameter. Besides the ordinary mallet a spoon-mace was used when the ball was in a certain position. At each end of the mall was an arch about 2 ft. high and 2 in. wide, called "the pass," and the player who rolled his ball beneath this "pass" in the smallest number of strokes was the winner of the game. The directions given by M. Lauthier for the selection of mallets and balls are very minute. He says of the mallet:—"If it is too long or too heavy, it catches the earth; if it is too short or too light, it does not give sufficient force," and adds, that in Provence and Languedoc they used shorter handles than at Court and in Paris. He recommends the learner to use first a short handle, and to add to its length gradually. The mallet-heads most in use weighed thirteen or fourteen ounces. The balls were made from the roots of box, and great pains were taken to bring them to a state of perfection. M. Lauthier writes,—"They are cut and allowed to dry for a certain time, and after that are turned in a lathe and beaten to a proper surface. At first they are only played with light strokes of the mallet on a gravelly soil; afterwards with harder; and they are always to be rubbed with pellitory before they are put away after being used. At last, by dint of blows from the mallet and rolling them about, they become hard. We notice those that go best, that is to say, which do not jump or turn from their track, or, to use the language of mall, which do not take the wind. These we must gauge when so finished, and store them in a bag with dirty linen, which is the best place, being neither dry nor damp, to keep them sound. We must weigh them, also, to know exactly the weight of those which go farthest, and which certainly ought to be regarded as the best." The balls appear to have been very unequal in merit, and there was one which gained an historic reputation and passed through the hands of several celebrated players. "A ball-merchant of Provence brought a large bag of balls to Aix. The players, who were in great number in this town, bought them all at thirty sous apiece, except one only, which, not being so pretty as the others, was rejected. A good player, named Bernard, came the last, and bought this waste ball, for which he would not give but fifteen sous. It weighed seven ounces and two drachms, and was of ugly wood, the half of it reddish. He played it a long time, finished it, and it became so excellent that when he had a long stroke to make it never failed him at his need, and led infallibly to his winning the match. It was called *La Bernarde*. The President of Lamanon, who has had it since has refused a hundred pistoles for it several times. Louis Brun, one of the greatest mall-players that there have ever been in Provence, who on a smooth ground, without wind or slope, used to drive a ball as many as 405 paces, wished to make trial of the Bernard. He played it several times with six other balls of the same weight and the same size, and his stroke was so equal that the five others lay nearly all together, with only a foot or two of difference. But the Bernard was always found fifty paces farther off than any of them; which led him to say in joke one day that, *with the Bernard, he would play at long shots with the Devil*. There can be no doubt that what this ball had peculiar to it was, that it was equally heavy throughout, from its surface to its centre, since it sustained itself so well in its roll; while the others—which did not do the same, although of proper weight,—were unequal in their circumference, being heavier on one side than on the other, and this made them run crooked, in jumps or in bounds." We have seen that judgment was required in the selection of the mallets and balls, but besides this it was necessary that the mall should be smooth and carefully preserved. The one in St. James's Park was strewn over with powdered cockle-shells, and the man employed to keep it in order was termed the cockle-strewer. Charles II. was very fond of the game, and appears to have been a good player. The poet Waller wrote in courtly fashion:—

> "Here a well-polish'd mall gives us joy,
> To see our prince his matchless force employ,
> No sooner has he touch'd the flying ball,
> But 'tis already more than half the mall:
> And such a fury from his arm has got,
> As from a smoaking culverin 'twere shot."

Dr. Prior has added to the value of his little work by reproducing from the French account of the game four illustrations representing the mode of play. In the first the player has the mallet straight down in front of him, touching the ball, and is aiming and preparing to strike it; in the second he has raised the mallet above his head, and is about to strike the ball; in the fourth he is a few feet in front of the pass, and is throwing the ball through it with a spoon-mace; in the third the position of the hands on the mallet-handle is shown. It appears that there were four different ways of playing at pall-mall, and Lauthier suggests another mode which might be played according to the rules of billiards. The following description explains the points of variety:—"1. Playing at *rouet* is when each person plays by himself and on his own hook. In this case one only, upon passing to the pair, or at most when he finds himself in order, gains the prize agreed upon for the *passe*. 2. Playing *en partie*, or a match-game, is when several persons place themselves on one side to

play against others of equal strength and number. If the number is uneven, a player on one side may be allowed two balls till another player arrives to fill the vacant place. 3. Playing at *grand-coups*, or long-shots, is when two or more play at it, who shall drive a ball farthest, and when one is stronger than the other, the weakest asks an advantage, either in distances of trees or distances of paces. 4. *Chicane* is played in the open field, in alleys, on high roads, or anywhere that people meet. A player usually begins with a flying shot, after which he should send the ball into any place he can find, that is stony or encumbered. The match is ended by touching a tree or stone that is marked to serve for goal, or by passing certain boundaries upon which the parties are agreed; and the one whose ball, after having cleared this goal, shall be farthest off, supposing the players on the one side and the other to be even, will have won." This last game is really not pall-mall at all, but hockey.

Having made a long digression into the history of the game that gave its name to the street, we will now return to the consideration of the street itself. Shortly after the Restoration, a warrant was issued "for the building of the new street to St. James's, in the line of the old road: this was called Catherine-street, after Queen Catherine, of Braganza; but the name never took root, and the most usual designation was the "Old Pall Mall." We have seen what was the state of the place at the end of the sixteenth century, so that it will be well now to picture it during the successive centuries. It took its place at once as a fashionable street, which was but natural, considering its agreeable situation, the houses on the south side having gardens leading down to the park. Physicians, philosophers, statesmen, painters, beaux, and king's mistresses flocked to Pall Mall. Dr. Sydenham was one of the earliest inhabitants, for he was here before before the Restoration. The Hon. Robert Boyle, who refused the presidency of the Royal Society, lived with his sister, the Countess of Ranelagh, in this street for more than twenty years, and both died within a week of each other in 1691. Dr. Barrow, Sir William Temple, Jean Baptiste Monnoyer, the flower-painter, a roomful of whose pictures are to be seen at Hampton Court, Handsome Fielding, who was found guilty of bigamy, but pardoned by Queen Anne, Mrs. Mary Knight, the singer, and Nell Gwyn, all lived here. We may easily imagine most of the noted men of the day walking along this street, but we know that in 1660, Pepys was to be seen frequently passing to "Wood's at the Pell Mell (our old house for clubbing)," where he stayed till ten o'clock at night. So early in its history was Pall Mall known for its clubs. Eleven years after this, Nell Gwyn might have been seen sitting at the end of her garden talking with Charles II., who would afterwards saunter along the King's garden (which extended from St. James's Palace to where Carlton-terrace now stands) to have a chat with the Duchess of Cleveland. The following advertisement from the *Postman*, April, 1703, shows us what these houses on the south side of Pall Mall once were:—"One, two, or three houses about the middle of Pall Mall, on the park side, with gardens and mounts adjoining to the Royal garden to be sold, or let by long lease." We now pass on to consider the state of the place in the eighteenth century. Gay describes it in glowing colours:—

> "Oh! bear me to the paths of fair Pell Mell:
> Safe are thy pavements, grateful is thy smell!
> At distance rolls along the gilded coach,
> Nor sturdy carmen on thy walks encroach;"

but he cannot write entirely in praise, and therefore adds:—

> "Yet still e'en here, where rains the passage hide,
> Oft the loose stone spirts up a muddy tide
> Beneath thy careless foot; and from on high
> Where masons mount the ladder, fragments fly:
> Mortar and crumbled lime in show'rs descend,
> And o'er thy head destructive tiles impend."

John Macky (1722), whose contemporary sketches of London are very valuable, speaks of Pall Mall "as the ordinary residence of all strangers, because of its vicinity to the King's Palace, the park, the Parliament House, the theatres, and the chocolate and coffee houses, where the best company frequent." Our forefathers tolerated and even delighted in sports that would scandalise us now, so different were their habits and feelings to those of the present age. We read that in the year 1733, four women ran a race at three o'clock in the afternoon from one end of this fashionable street to the other. Sixty-one years after this a notorious woman stood in the pillory in Pall Mall from twelve to one in the afternoon. During the hour she remained there she was pelted with mud, rotten eggs, &c., by the indignant spectators, and she left the place amid loud hisses from the people who had collected in large numbers on the occasion. We know that formerly the roads near London were infested with footpads and highwaymen, and it does not, therefore, surprise us to learn that in the middle of the seventeenth century when there were hedges and ditches on the side of Bond-street, a thief after taking a silver tankard from Dr. Sydenham's house in Pall Mall, though pursued, was lost sight of at that unfrequented spot, but it is a staggering fact that on the 7th of January, 1786, the mail was actually robbed in Pall Mall.

The present state of the street we all know, but its appearance was very different at the beginning of the century. Then Carlton House stood where the Athenæum and United Service Clubs and Carlton-terrace now stand, and most of the houses were commonplace and undistinguished. On the 26th of February, 1811, the Prince of Wales held his first *levée* in Carlton House as Regent, and on the 19th of June he gave a supper to 2,000 guests, some of these being the French princes and emigrant nobility. The preparations for this entertainment were of the most gorgeous character, and a stream of water filled with gold and silver fish was made to flow through a marble canal down the centre table. In 1827 the house was pulled down, and the gardens destroyed, when the old rooks that lodged in the trees migrated to New-street, Spring-gardens. The first exhibition of Winsor's system of lighting the streets with gas took place on the King's birthday, 1807, and was made in a row of lamps in front of the colonnade before Carlton House. Two years after this, Sir Humphry Davy gave it as his opinion that it would be as easy to bring down a bit of the moon as to light London with gas. One of the well-known characters of Pall Mall was "Big Sam," the porter at one of the lodges of Carlton House, who was 8 ft. high, and could peep over the gates into the street. Another was Sir Thomas Charles Bunbury, whose first wife was Lady Sarah Lennox, and who died on March 31, 1821, in his eighty-first year. He was for fifty-eight years engaged on the turf, and during fifty of these he was Steward of the Jockey Club. He was very abstemious, never drank spirits, and never wore gloves. We have no room to describe the various historical houses, such as Marlborough House and Schomberg House, nor the celebrities that have dwelt in them. We must not, however, omit to mention the intimate association of the street with art and artists. John Julius Angerstein, the founder of the National Gallery, lived here, as did Robert Vernon, the founder of the Gallery of British Painters. Gainsborough and Cosway lived at Schomberg House, Boydell founded his Shakspeare Gallery in Pall Mall, and the British Institution held their Exhibitions here for many years. At a house opposite Market-lane, and to the east of Carlton House, the annual exhibitions of the Royal Academy were held from 1768 to 1780.

Pall Mall can boast of more celebrities than would be sufficient to set up the reputation of many a city, and among its inhabitants have been the representatives of all classes and professions. Of royalty, there have been two Princes of Wales, a Princess Dowager of Wales at Carlton House, and a Queen Dowager at Marlborough House, a Duke of York, and a Duke of Cumberland, and in a private drawing-room a Duke of Gloucester was married to the Countess Dowager of Waldegrave (Horace Walpole's niece). Of soldiers, there were the great Duke of Marlborough, and the Dukes of Schomberg. Of statesmen, the great Earl of Chatham. Of doctors, Heberden and Mrs. Mapp, the bone-setter. Of authors, Steele, Sterne, and Gibbon. Of booksellers, Dodsley and "honest Tom Payne"; and of auctioneers, James Christie, the *Specious Orator* in Dighton's caricature. The street still keeps up its ancient fame, and it will long continue to do so, with a popular Prince and Princess of Wales at Marlborough House, and rows of clubs that number on their rolls of members all the greatest churchmen, statesmen, soldiers, authors, and travellers of the day.

Southwater.—A small Congregational church has been recently opened at Southwater, near Horsham. The architect is Mr. Ranger, of Finsbury-pavement; the builder is Mr. J. Robinson, of Billingshurst.

DECAY OF THE BRITISH LION!

Long years before Lord Macaulay's interesting New Zealander shall pay this country that prophesied visit in order to contemplate the past glories of our civilisation generally, and the shattered stones and pillars of St. Paul's Cathedral in particular, the observer who takes an interest in ruins will have an opportunity of gratifying his taste by making a call at a spot which has been spoken of as "the finest site in Europe"—we mean Trafalgar-square. There he will observe the colossal and once majestic forms of four lions, honey-combed, gashed, and knocked out of shape as much as a cast-off tin kettle which has been delivered over to the kicks of destructive boys. In plain words, Landseer's lions are going to the dogs. The wearing, biting atmosphere of the metropolis is proving itself more than a match for the metal in which the statues are cast.

The truth of this statement may be tested by any one who will one morning examine the lion which keeps watch and ward over his opposite neighbour, the Sun Fire Office. A glance or two at the paw and foreleg of this afflicted animal will reveal the existence of a number of holes, which completely penetrate the very thin substance of the metal. This may be regarded as the first stage of the animal's complaint. In the second stage the symptoms are very severe and aggravated. The small holes are prolonged into an ugly jagged gash, not very wide, it is true, as yet; but, as Mercutio says, though "not so deep as a well, nor so wide as a church-door, 't is enough, 't will serve." On the first blush of the matter, this premature and much-to-be-deplored decay, would appear to be due to the inferior composition of the alloy which renders it a prey to the oxydising and corroding action of the London air and weather. Again, the casting is decidedly too thin. Our examination of these statues has been only a passing one. A proper scrutiny will undoubtedly reveal even greater ravages than those we have described. The public will ask, as they have a right to ask, for an explanation. Moreover, something should be done.

THE CENTRAL DOME OF THE VIENNA EXHIBITION BUILDING.*

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

To the Institute of British Architects, I, who am no architect, only an engineer, will not try to describe the architectural qualities of the great building which was provided at Vienna to welcome and shelter the scientific and artistic works of all nations in their world-wide Exhibition which has just been closed. That building was the largest, and possibly the most completely adapted to its aim, that has yet been seen. I am also of opinion that it possessed a high degree of fitness to the purpose prescribed for it; that it was a wise application of the peculiar resources, materials, and artificers, of the countries among which it was raised; and that its architecture reflects great honour on the architects of Vienna, and exhibits, in a remarkable manner, the specialties for which they are eminently distinguished. But I am not an architect, and therefore I hope that some member of your own Institute, who has visited Vienna and studied that remarkable building, will give you the benefit of describing it for your professional information, and will do the architects of Vienna that honour which only a professional judge can worthily bestow.

All that I as a professional engineer can venture to do, is to submit for your consideration those engineering principles and those mechanical expedients which I think may possibly be of service to your profession, in those great works which you and your successors will be called upon to undertake in the architecture of the future. Some of these principles are illustrated in the great building at Vienna, and some examples are there given of these inventive contrivances. These you may possibly think fit to approve in principle, and to adopt in your own future practice. My own special work is the great central iron dome.

So far I shall only be doing that which is strictly within my own province as a special professional engineer. Permit me, however, to say that I shall find it impossible not sometimes to express my feelings on matters of which I have no professional knowledge. I cannot help

* By Mr. J. Scott Russell, F.R.S., read on Monday, the 9th inst.

feeling admiration for a beautiful form, even when it has no mechanical merit, and I cannot help hating a hideous deformity, even when it is held up before us as a useful and meritorious work. There are good strong bridges, built by us engineers in the City of London, and huge railway stations, which we find it useful to use, and both one and the other inflict sharp pain on me whenever they cross my sight, and remain on my mind as monuments of hideous deformity, which a people endowed with any slender sense of beauty ought never to have suffered to exist. These things, when I return from countries where the sense of the beautiful is the seventh sense, even of the uneducated mass, pain me much, and make me feel that if in some things we English appreciate the beautiful, we are totally wanting in a sense of the ugly! Hence, everywhere throughout London prevalent costly elaborate ugliness pains the eye and shocks the mind.

Now I do not blame architects for this—no engineer dare say so,—for we have created in the last fifty years, that is during my own professional lifetime, I say, we engineers have created a greater number of ugly structures throughout all the cities of England than have ever been built by all the architects of the world, from the tower of Babel downwards. I do not, therefore, blame the architects of England for the ugliness of our great public works, and the hideosities of our great cities. In our northern races, under our northern clouds, the sense of beauty is feeble, the sense of ugliness is null, and if we are ever to know, love, and enjoy the beautiful in the works of humanity all round about us, as we do love and enjoy the beautiful in the works of divinity all round about us, it must be accomplished by a great national movement, undertaken by the educated and skilled part of the English people, to initiate, communicate, and spread throughout the working classes as well as the thinking classes, a belief that there are principles of beauty and of ugliness as fixed and sure as other laws of nature, and that these principles are exhibited every day to us by the lovely handiworks of God in trees and mountains, clouds and leaves, and flowers, and insects, and shells, and stars; and that if we do not make all the works of man to resemble the works of God, in beauty of form, beauty of colour, beauty of proportion, and order, and play, and grouping, it is not because there is any impossibility of doing it, but merely because we have not been systematically educated to believe in the truth of beauty, and in the hatefulness of ugliness, and that we are not habitually trained from our youth up, to select the lovely and reject the ugly; that we have not governors and rulers, who hide ugliness as injurious to youth, and surround children in schools with all that is comely and graceful. These things are all wanting to our children, and so we grow up ignorant and prejudiced, insensible to ugliness, incapable of selecting the better from the worse, exposed to continual dissight and disgust.

It is not my intention to go into matters of taste and beauty in architecture at all in this paper; but these remarks I could not omit, because they are the motives which induce me to venture to occupy this evening. It is my opinion that in matters of education, and in matters of profession, you the architects, and we the engineers, have need of one another, that we can greatly benefit each other's work by sympathetic co-operation, that the public works of our country would be greatly improved if every public edifice were at once a model of architectural beauty, and an illustration of wise engineering construction.

What architects and engineers could do, and, after my mind, should do, is to come into cordial fraternal union in the creation of the great structures which are to form the architecture of the future from the beginning, to frame their designs together from the outset, and, by a sympathetic cordial adoption of each other's views, to contribute each his part to a perfect whole. I admit frankly that all architects and all engineers cannot work well together; we are each apt to be obstinate and pig-headed in our own way, and to yield little or ungraciously to the other. But that is also the difficulty of common life. In all human work we are bound to co-operate, and the permanent pain of human life is imperfect half-hearted co-operation in the duty we must perform.

I propose to you, as the way to initiate this co-operation for the future, a close union of the two professions, in the education of the rising generation of young architects and engineers, so as to co-operate intelligently with each other in the works of both professions. We ought to know something of each other's professions, we ought to know, not that superficial little which might make us fancy we should meddle each in the other's part of the work; but we ought to have that deeper knowledge which teaches us that we know nothing, or, at least, not enough to warrant our touching the other's work. When we both know that much of what the other has to do, we shall be sure to let it alone. Let, therefore, the young engineer be well trained in architecture, and the architect well trained in engineering principles, and both will give each other valued aid, and both abstain from harmful interference.

I feel it my agreeable duty, in laying before this meeting of the architects of England a description of my own work in the great building at Vienna, to say how much benefit the whole of that building, and especially my portion of it, owes to your profession. You all remember the marvellous excellence of the original Exhibition building in Hyde-park, and you all have recognised the distinguished merit of the Crystal Palace at Sydenham. As I am intimately acquainted with the story of these two buildings, which are the first types of a new nature of construction, I will venture to say that some of the ablest mechanical engineers of our time, and some of the ablest members of your Institute of Architects, combined their highest efforts to give excellence to their common work, that the two professions co-operated cordially and harmoniously, and that they and we are all proud of the results.

In like manner I have to say for my own iron building at Vienna, that from the beginning to the end of the design I am deeply indebted to members of your profession for kindly help and cordial co-operation. When I made the first sketches of the Vienna building, the designs were all drawn for me by Mr. John Crace, the worthy son of a father who had long before acted a distinguished part in beautifying our two first palaces. It was on his drawings that the design of my dome was first shown at Vienna. Where these drawings of his do not correspond to the work as executed, it is because the rest of the buildings all round my dome were decided to be of a quite different style, and because, as they were to form parts of one great whole, it became expedient that the same Vienna architects who designed the architecture of the surrounding portions, should design the architecture of that, so as to be in harmony as a whole. I have great pleasure in saying, that in Vienna I received as genial sympathy and as cordial co-operation in the great work in which we were engaged, as I have always received in any matter of joint interest from members of this Institute. The architectural features and decorations of the tomb, as now executed, are the work of M. Hasenauer, who, at an early age, has earned high distinction, and who inherits the traditions and talent of your profession from his distinguished father.

GENERAL DESCRIPTION OF THE CONIC DOME AT VIENNA.

The iron dome at Vienna is, I believe, the largest vaulted roof in the world. I think it covers nine times the ground of the dome of St. Paul's, eight times the area of the dome of St. Peter's, and seven times the area of the dome of St. Sophia, at Constantinople.

The dome is 360 ft. in diameter, and 1,080 ft. round. It stands on a ring of thirty columns, 36 ft. apart all round the circumference. Within this ring of columns there is no support. The upper dome, 100 ft. diameter, admits light by a series of windows, 40 ft. high and 10 ft. wide, between thirty columns which carry the upper dome. I fancy the English architect will get the best feeling of the magnitude of this interior by going into St. Paul's Cathedral, looking up to the inner dome, and then imagining all the columns that carry the roof done away, and the upper dome left suspended in the air, but sustained by a lower dome resting only on the outer walls. The area covered, the height, and the dimensions, are sufficiently near to give the true impression according to my feelings, and I hope, therefore, to yours.

Although the dome is carried on these thirty columns at intervals of 36 ft. all round; and although the structure of the whole dome conforms to this symmetric division, two more columns are introduced by intercolumniation at the two entrances to the grand avennes, making in all thirty-two columns. These give beauty and do not destroy symmetry.

The slope of the cone is thirty degrees. The length of the slope on all sides is 200 ft. The roof is formed of 360 iron plates, tapering uniformly upwards from the circumference to the apex of the cone. They are riveted like the plates of a ship, each row of plates covers one degree of the circle, each bottom plate is one yard wide between the lines of rivets, and one metre wide over the lap.

The thirty columns which carry the cone stand round the circle at 12 degrees apart, except at the two intercolumniations. They are 36 ft. from centre to centre; each carries an arch and an upper gallery all round the inside. These columns are 80 ft. high.

The heights of the whole in round numbers are—columns, 80 ft.; cones, 100 ft.; windows, 40 ft.; lantern and crown, 60 ft.; say 280 ft. from floor to crown, besides foundations of 12 ft. to 20 ft.

This conic dome roof has no visible external wall; it is surrounded by a circular ring building, which consists of the great central nave of the longitudinal axis of the main building, carried circularwise round the cone, and forming, so to speak, a circular aisle, or series of side-chapels, all round about it. The conic roof, therefore, as seen from the exterior, crowns the large low buildings by which it is surrounded, and seems merely to grow out of them, and to group them round it, into one whole, of which it is the centre. The whole outside decoration of both was meant to harmonise them, and not to give predominance to part. This circular ring, nave, or arcade is 40 ft. wide by 80 ft. high, carried on a second ring of outer slender columns, and opening out into four enclosed courts, or gardens, by large semicircular windows and many doors. This arcade extends the circle of the central building to 440 ft. diameter. It has the great convenience of forming a continuous communication through the entire length and breadth of the building with all the main entrances, without disturbing the central area of the great dome,—a quality of much practical convenience.

I defer to a later point the further description of the rest of the building, in order to enter at once on the theory and mechanical principles of the conic domic structure.

MECHANICAL PRINCIPLES OF CONIC DOME STRUCTURES.

I think I shall bring this subject most clearly before you by saying at once that I confine my remarks to the peculiar principles which it seems to me should govern the proportions and indicate the structure of *very large* buildings, as distinguished from ordinary small ones.

The result of the investigations I have been occupied in making on this question, during some thirty years, is shortly this—that a certain conic form develops the strength of that modern material called wrought iron, on a large scale of structure, so as to attain the maximum possible of strength, economy, and endurance.

When I have satisfied you of the soundness of this conclusion—first by theory, secondly by experience—I hope that the result will be that you will adopt the conic dome, as one of those forms out of which you will develop combinations and proportions, satisfying to the mind of the spectator, sweet to the eye, as well as useful, economical, convenient, and durable.

The Nature of the Material.—The one characteristic of iron for permanent and powerful structures is that which is the criterion of good metal, viz.—that its tensile and compressive powers be equal, or that it should possess toughness as its characteristic. I have seen a select piece which had a tensile force 100 tons on the square inch, which would snap by the slightest concussion. Cast iron with a tensile force of 5 tons only may resist a crushing force of 20 tons. Materials for good iron construction may have as their measure 20 tons tensile and 20 tons compressile force, and be at the same time in a high degree tough. That, and that only, I call good building-iron. When I use the word "iron," I mean that I do not care if its mercantile name be steel, iron, or toughened casting. It is easy to see that it is this equality in power to bear two opposite kinds of strain that has made modern wrought-iron plate so rapidly displace cast iron in large structures. When I want a long girder, I find that the top breaks by one force, the bottom by the other, and if either is weaker, the excess of strength in the other is no good. True, an ingenious remedy is made in cast iron by making the tensile side of the beam fourfold in weight and size; that, however, means also fourfold cost. If, therefore, the

material is not more than double the cost, the advantage of casting ceases, and modern wrought-iron plate becomes better and cheaper. The two opposite qualities should, therefore, in good building-iron be equal.

The Modes of applying the Material.—With good, well-balanced material as wrought-iron, the question as to the best mode of using it becomes more clear and precise, also its use becomes certain and reliable; and we can now enter upon the examination of the forms which best unite with those qualities of iron in producing a high result.

What I undertake, then, to demonstrate to you is,—that with modern iron as the material of construction, the conic form on certain proportions makes the cheapest, strongest roof, on the largest possible scale. It consists of the minimum of material all set the best way.

This is a large proportion, and in order to prove it, I fear I am obliged, like a proposition of Euclid, to go a great way round about the question, because, before I can show it to be the best way, I must show it to be better than the other ways hitherto called the best ways. That I will do as quickly as I can, by taking only the best known ways.

The Common Ways of applying the Material.—I take the first best modern way known to us, the iron beam, or straight girder, top and bottom alike, called a rail, a parallel beam, or a bridge girder. I take a pair of high walls, and I lay these girders across from wall to wall (or from wall to column, and from column to wall), and I get a simplest possible roof, perhaps the strongest of its kind.

Now, what is the case of this roof as regards strength? The top is all in compression, the bottom is all in tension; one is in danger of being crushed, the other is in danger of being torn. When either gives way, the other's strength is useless; the yielding of one half leaves the other half worthless.

This beam roof consists, then, in two separate halves, which are independent, even contrary in their action, as neither helps the other. But there is also a third, the middle web, which may, in a deep beam, hold as much matter as one of the others. This beam also is rendered useless the moment the top or bottom has given way.

Three things, then, do different work, in which neither can help the other with spare strength, to supply and make good its weakness; one broken, all three are gone. What, then, is the case of such a beam when breaking, that only one-half of its strength has been useful? But the case is worse than this, the beam is at least twelve times its depth in length. There are few uses for which it would not be more. Now, what does this leverage do? Does it help the beam to carry weight. No! it helps the weight to break the beam.

Let us examine the action of weight on our beam. Let us take, not half, but the whole as effectual leverage for strength. The length of lever then is six to one; in other words, the weight on the beam brings a strain on the top, tearing the iron asunder with sixfold its natural force per square inch of section. The strain brought on the top is sixfold that amount, also crushing instead of tearing it: neither helps the other, nor participates in its strain. What the third part or central web does is really to help the weight to tear the bottom asunder, and to help the weight to crush the top at the same time. The middle is a mere instrument for setting top and bottom against each other; it is really the fulcrum which ruins the mechanism. Around the centre acts the leverage. The resistance of the top tears the bottom; the resistance of the bottom crushes the top; the middle helps each to ruin both.

A lever, then, consists of two parts set against each other in antagonistic attitude to destroy each other. Whilst neither yields all is stable. When the weight, the leverage, and the antagonism united force one to give in, all give way. A lever is a combination of antagonisms. Its power of doing work is only a surplus, a balance, a mere difference of opposites. In a strong combination the result is a large vote with a feeble majority. This same waste of useful force in useless antagonism is characteristic of another set of combinations with which you are equally familiar,—I mean the whole group of trussed roofs. You take two walls, and instead of laying from one to another the straight girder I have mentioned, you lay across two girders, which we may call rafters. You lay them sloping opposite ways, in order that by opposing pressures they may balance each other. They do balance; and if the angle is high, the harm is small. As you moderate the height or pitch of the roof you increase rapidly the waste strain. You soon make it manifold. The original weight and the two beams meeting, push against each other with high destructive power. They do not only push against each other, but they push against the walls they should unite and support. These walls must be kept from falling by other walls supporting them, which you call buttresses, or more waste. To spare this waste you take another,—you take a set of new beams, which you call tie-beams, and you set a pair of tie-beams, joined in the midst, and you set the two tie-beams to undo the harm which otherwise the rafter-beams would do to the walls. You waste double material to stop harm of your own choice. A roof-truss is only, therefore, another form of waste,—waste aggravated by the smallness of the slope we select,—waste doubled by the precautions we invent to undo it.

First Principle.—Unity without Antagonism.—Lever roof and trussed roof are mere modifications of ingenious waste, in the ways in which they have been generally used. The question I now submit is this, whether this double waste may not be avoided?

In my opinion it is avoided in my conical roof. I think there is in it no waste. I think every atom of iron in that roof does its own work only. No particle does work of antagonism. In short, it is a congregation of atoms working together for the common support, without counteraction, disagreement, or waste of strength, or means, or work.

This one principle of perfect unity of co-operation in the atoms of iron, without antagonism and waste, is one principle, and the first peculiarity of the cone. There is a second peculiarity, which I place second, because it only grows in importance with the largeness of the scale of the structure. When a structure is small, as in a railway bar, a crossing girder bridge, a bridge of moderate span, the load it may have to carry may be manifold its own weight. A bar may weigh a hundredweight and carry a ton; a girder may weigh a ton and carry 10 tons; a girder may weigh 50 tons and have to carry 100 tons.

When, therefore, the scale of structure is small, its own weight may be the smallest element in its work. When the scale of structure is large its overweight becomes very rapidly its own heaviest load, and may easily become its own heaviest cause of destruction.

Second Principle.—Wise Distribution of Structural Load.—The next principle to which I call attention is, therefore, the wise distribution of the load of the structure, and especially of that heavy load of its own material on the large scale.

This principle finds its happiest illustration in the cone. The distribution of the load of its own structure is the best possible. The cone gives an absolute maximum of sustaining power when on the large scale this principle rules the structure.

As an example of the contrary of this wise principle of distribution, I take the form of structure most approved in modern practice, and sanctioned by modern science, not always wisely applied. I take the elliptic or parabolic form, so frequently and within certain limits, rightly applied. In this form the depth is proportioned at each point of length to the strain at that point. This strain is greatest at the centre of length, and least at the ends. This is right on a small scale; on a large it commits a grave error. The error is this,—that exactly in the place where a load produces the greatest amount of destructive effect, there is the place chosen to place the largest quantity of destructive load; and just at the ends, where weight would produce the smallest amount of injury, that is chosen as the point where the least destructive load is laid.

On the small scale, where the weight of the structure may be insignificant, there may be an insignificant amount of inconvenience from it, and we may afford to neglect, though not ignore it. When the scale grows colossal the danger becomes formidable.

The distribution of the load in the cone is just the contrary of this, and is the wisest possible. We are entitled to remove all the heavy loads off from the points further from support, and to place all the heaviest weight on the points nearest the vertical support. Thus the strain on the matter is a minimum and the weight of the material is a minimum, and that minimum is in the place where more would be harmful, and the maximum is in the place where maximum weight does minimum harm.

The second principle deserves the greatest attention, because the benefit it confers is twofold, and because it is the contrary of that most frequently taught, sanctioned by science, and generally acted on. It was well known as the Fish-bellied Rail, and as the Bow and String Form, but is chiefly distinguished as the Parabolic, or Elliptical Girder, once much made in cast-iron, and still largely copied in wrought-iron.*

THE TREASURE-TROVE OF PRIAM, AT TROY.

THE Constantinople correspondent of the *Cologne Gazette* writes under date of 28th January as follows:—As already known, the governor of the Dardanelles, Nassif Pasha, has had two workmen arrested and their domiciles searched, on the ground that they had, at the place of Dr. Schliemann's discoveries, likewise found valuable objects, and wrongfully appropriated them to their own use. This suspicion, as is now known, was well founded. Schliemann left the scene of excavation with his treasure in June of last year. Already three months before, one evening in March, two Greek workmen, Staliono Panayoti, from Kalafatly, and Lezeb Costandi, from Jenischetir, came, at a depth of 30 ft. and distant 20 ft. from an old wall, upon a pot, 6 in. high and 3 in. in diameter; the weight of which led to the conclusion, which proved correct, that it contained valuables. In the dead of night the find was moved, divided, and safely concealed. At the domiciliary visit lately made, Lezeb Costandi's share was found untouched; Panayoti, on the contrary, who was betrothed to the daughter of a dignitary of his village, had deposited the greater part of his treasure with his future father-in-law, and the latter had gone to a goldsmith in the neighbouring Renköi to order jewelry for the bride to be made, and to have it melted down for this purpose. The following valuable objects were originally contained in the pot:—A gold plate, 1 in. thick and 2 in. square (melted down); two gold rings (disappeared); two pairs of gold ear-pendants (found at Costandi's); two gold brooches (found at Costandi's); two gold bracelets (found at Costandi's); a thin gold flat head-band (melted down); four rosaries of gold balls as large as hazel nuts (of which Panayoti's two have disappeared); a large number of gold rosaries, with beads as large as peas (of which part have been found at Costandi's, part melted down); a large lump of gold, which had been found near the pot covered with coals, &c., and no doubt originating from objects which had been melted during a great fire (found at Costandi's); a number of small chains and several bars of gold (!) (likewise preserved by Costandi.) There is no doubt that we have, in this instance, before us real antiquities. In other respects the Orient, and especially Constantinople, offer most incredible examples of forgeries. Amongst others, it is now well known, that a Persian governor has in his castle a manufactory of antique stones and coins, supposed to date from the Arsacidæ. The inscriptions, only lately discovered, of the Homerides, of whose existence, language, and writing, hardly anything, or very little, is known as yet, are already offered for sale in Arabia. Even in Constantinople, where the propylæa of the Hagia Sofia are being pulled down and the ground undermined, the workmen offer to the traveller antiquities and coins, supposed to have just been found in the ground, which have been manufactured a few weeks ago in our suburb, Galata.

THE AMERICAN INTERNATIONAL EXHIBITION OF 1876.

WE have already mentioned that in addition to the great temporary building for the intended International Exhibition in Philadelphia, a permanent hall was to be erected, which, during the period of the Exhibition, would constitute the department of the fine arts. We now learn from the Philadelphia papers that the design for the hall has been completed by Messrs. Collins & Audenreith, architects, of Philadelphia, and approved by the authorities. The two departments, technical and fine art, are to be connected by a broad covered way, 175 ft. long. The building will occupy a commanding site on

* To be continued.

a raised terrace, and all the surroundings are favourable to the effective treatment of the design. The ground plan is cruciform, the arms of the cross having a width of 123 ft. The length through the longer arms, the ends of which are semicircular, is 420 ft.; extreme depth through the shorter arms, the ends of which contain the main front and rear entrances, 320 ft. From the intersection of the arms rises a dome, having an exterior diameter at its base of 108 ft. The width between its supporting columns on the main floor is 87 ft. Height above the floor of the first gallery, 55 ft.; of the second gallery, 88 ft.; to the balcony of the lower lantern, 184 ft.; to the top of the lantern (inside), 216 ft.; to the balcony of the upper lantern, 230 ft.; to the top of the surmounting figure, 278 ft. Total height from the terrace, 284 ft. The dome is flanked by four similar engaged towers, two on each side of the main approaches.

The clear width of the nave is 58 ft.; the average height above the floor, 70 ft.; clear height at the ridge of the louvre, 94 ft.; clear width of the aisles, 22·6 ft.; average height of the aisles above the floor, 49 ft.; gallery floor above the first floor, 23·4 ft.

No partition will separate the aisles or galleries from the central nave, free passage being allowed between the supporting columns. It is proposed to use stained glass for the windows in the dome, and to use the central rotunda for a general resort for visitors, and not for exhibition space.

Four large stairways lead out from the rotunda up to the galleries, and the towers are utilised for additional stairs to the upper portions of the structure. The basement contains, besides quarters for the janitor, retiring-rooms, boilers for heating, and supplies for the building, also ample offices for the Park police, with entrance from the outside, as it is expected that the building will become one of the principal stations.

The *Polytechnic Bulletin* says the Grand Pavilion, or Main Exhibition Building, constitutes the Technical Department. This will have a length of 2,075 ft., and a width at the centre and ends of 1,000 ft. The length of the Agricultural Hall will be 1,400 ft., and of the Machinery Hall, 2,275 ft. The latter is located within a very short distance of the Pennsylvania Railroad-tracks. A siding will be made by which heavy castings can be run directly into the hall, while wagons containing machinery can enter the department from the street without traversing the Park roads. The Grand Pavilion has similar easy means of communication from the highway and the railroad.

The area of ground in the Park appropriated to the purposes of the Exhibition is 450 acres. Of these the Grand Pavilion will cover 30·5 acres, and the edifice is to be constructed with a capacity for expansion, so that it may be made to extend over 44 acres. The Machinery Hall will occupy 9·5 acres, and the Agricultural Hall, 4·5 acres.

THE PUBLIC LIGHTING OF RYDE.

THE Town Council of Ryde, having received numerous complaints for a long time of the inefficient lighting of the street-lamps of Ryde, endeavoured to effect a better arrangement with the gas company in November last, for making a new contract with the company, the old one expiring on the 1st of January following; and having failed to do so, the council decided to allow the contract to expire, and to take the supply of gas for the future by meter, and resolved to adopt a *positive* meter sytem, not the *average* meter indication system adopted in other places, and which has not given the satisfaction expected. The council having been advised not to adopt wet gas-meters, and the old lamp-columns, which belonged to the company, not being suitable or of sufficient size for the application of a meter in the base, and some of them having been in use for very many years, it was decided that the whole of the lamps and fittings should be entirely new and upon the most improved principle, also that a meter should be affixed to *every* lamp.

The gas company are now only required to supply gas to the lamps, which they are bound to do by their Act of Parliament, at 5s. per 1,000 cubic feet, the town council lighting extinguishing, painting, and repairing the lamps and fittings.

Mr. G. H. Stayton, C.E., the borough surveyor, was instructed to prepare drawings and specifications for the supply of 220 lamps and meters, fixed complete, and tenders were received on December 7th, for the necessary works, that of Messrs. Allen & Co., of Upper Thames-street, London, being accepted, for the supply of lamp-columns, scrolls, and lanterns; and one from Messrs. George Glover & Co., of Ranelagh Works, Pimlico, for the supply of and fitting dry gas-meters, fittings, &c., complete. These works have been completed, at a cost of about 1,415*l.*, and the workmanship has given satisfaction. The work has been carried out under the superintendence of Mr. Stayton. This arrangement is expected to save between 200*l.* and 250*l.* per annum.

NEW BATHS AND WASHHOUSES AT WREXHAM.

WREXHAM, in Denbighshire, is one of the most rapidly expanding towns in North Wales; and within the last few years building has been going forward at such a rate of progress that the population has more than doubled itself. Several public buildings have been erected, and large sums have been expended by the corporation in the construction of new streets, and in the widening and improving of others. In addition to other works undertaken by them, the corporation have just decided upon the erection of public baths and wash-houses, and, having secured a site for the same, the buildings are immediately to be proceeded with. They have also just purchased the waterworks which have hitherto belonged to a private company. Amongst the new public buildings now in progress in the town is an orphan home, the foundation stone of which was laid with much ceremony a few months ago. The architect for this building is Mr. Lloyd Williams, of Denbigh, and the contractor, Mr. Samuel, of Wrexham.

COMMERCIAL PRINCIPLES IN FARMING.

AT the monthly meeting of the Farmers' Club held in the Salisbury Hotel, London, Major Lucas in the chair, Mr. J. J. Mechi read a paper "On the Commercial Principle as applied to Farming." He said that the main points for the application of commercial principles were fixity of tenure for tenants and facility in the transfer of land. How soon should they see an organised body of sworn land-brokers transferring land in a proper register-office as now done in the United States? It would be as easy and nearly as uncostly as a transfer of Consols if there were a register or map of each person's ownership and its conditions. Landowners had just as much right to deal with their property as the holders of any other property, and he desired to impress upon all parties who desired to give an increased value, and an increased use of improvements to the soil, the necessity for facility in the purchase of land. Their position in regard to food was becoming, and might become, more critical. They depended upon foreign nations for one-half the necessary supplies, and although their acres did not increase their children were steadily increasing. A war with the powerful nation which now supplied them might lead to disastrous consequences, but from the produce of their own farms the farmers knew that they could render themselves entirely independent of foreign supplies. Mr. Mechi then advocated the application of associated capital to agriculture, or the borrowing of it if necessary. He also suggested the extension of the credit system, and a better mode of book-keeping for farmers.

A discussion took place, in course of which Professor Wrightson said he cordially agreed with Mr. Mechi's observations. He was impressed with the idea that the commercial principle must be applied to agriculture. Security of tenure was the one thing wanted for the principle to be applied. What man would invest 5,000*l.* or 6,000*l.* in the improvement of land when in the event of his death his widow would lose the money, or in that of his failure that his interest in the lease would form no part of his assets? He also thought it would be better for the landholder, for the tenant, and for the labourer, if transfers of land were made easier. The outside public were clamouring for cheap food, and any barring of these improvements must become public questions. The tenant farmer must be placed in a proper and secure position, and the country looking to him for its supplies of food would prevent his opposing any mechanical and chemical improvements.

Mr. Treahewy thought there would be difficulties in the way of transferring land as suggested.

Mr. Bradshaw was at a loss to know how commercial principles could be applied to agriculture except so far as industry, energy, and intelligence might be applied to any pursuit. There would always be this difference between trade and agriculture, that the latter was, even after the exercise of the qualities named, dependent to a great extent upon the elements.

THE ROYAL GOLD MEDAL FOR ARCHITECTURE.

AT the last meeting of the Institute of Architects, it was announced that the Council had nominated Professor Ruskin for the Royal Gold Medal of 1874, subject to the approval of the general body of members, and to Her Majesty's gracious sanction.

AN ANCIENT CITY.

AN interesting account of the ancient city of Angcor, discovered last year in Cambodia by the French traveller, the late Lieutenant Garnier, has been given at the annual meeting of the American Geographical Society. The ruins are of extraordinary magnificence, both in point of extent and of architectural splendour. The sides of the principal temple measure no less than two miles and a quarter in circumference, and the remains of endless roads, buried in forests and jungle, contain monument after monument, "each, if possible, more astonishing than the preceding." The architecture and sculpture of this forgotten city exhibit a very advanced knowledge of the arts, and the great temple is described as the masterpiece of some unknown Michelangelo. Angcor must have been one of the greatest cities on the globe, and yet of its history no account remains. Nothing is known of its past, save that a Chinese traveller in the year 1202 mentioned its splendour, and that 300 years later it was referred to by Ribodoneyra as an ancient ruin.

DEDICATION OF A NEW MASONIC HALL IN BERWICK.

THE edifice, which is two-storied, and in the Gothic style of architecture, is at the eastern end of Walkergate-lane, and has an ornamental exterior, the façade and north side especially being sculptured. The doorway has small pillars on each side, and is surmounted by a carved arch, on the keystone of which is a representation of the square and compass. Directly above is an imitation of a scroll, with the Latin inscription, "Audi, Vide, Tace." There is also a large mullioned window, having two principal lights, and a circular one at the top, within which is a design of a double triangle. At the sides of the windows are two ornate pedestals, for the statues of the patron saints of Freemasonry, namely, St. John the Evangelist and St. David; and above these are canopies, carved. Over the window is a medallion, with a device of a triangle, enclosing an image in relief of the All-seeing eye. The lower ends of the gables are surmounted by carved ornaments, and a vane with the four cardinal points is placed upon the finial at the upper front extremity. On the north side there is a large central mullioned window, with three lights and a cinquefoil top. At each side there are two small pillars, with capitals, as supports of a small gable, above which is a finial, with the device of a globe on its top. Over the under window is a design of a Freemason's mallet. The other windows are either of one or two lights. On this, as well as on the south side, there is a moulding running along almost the entire length of the building, with carved work at each end. The internal arrangements are satisfactory.

On the left side of the entrance there is a cloak-room, and a wide corridor leads to a spacious banqueting-hall, where it is expected that a hundred brethren will be accommodated. Two gaseliers of a star-shaped design are suspended from two paterœ in the ceiling, which is adorned with a cornice. Behind is the kitchen, fitted up with all the necessary appliances for cooking. At the west end of the corridor a winding staircase with an ornamental balustrade, leads first to an ante-room, and then into the grand hall, which is decorated

more than any other part of the interior. The roof is vaulted and supported by rafters, underneath which are corbels, these being representations of angels. At the east end is a dais. The cornice, which is of wood, is adorned with geometrical designs forming ventilators; pictures are also to be hung against the west wall. The upper hall is lighted with a sun-burner. The design is masonic, having the square and compasses, and All-seeing eye, encircled by a corona. There are six triangular lights, from which are suspended the six principal jewels of the craft,—that of the master, past master, treasurer, secretary, senior warden, and junior warden. The total number of gas jets is 120, over which is a reflector of silvered glass. The sun-burner is the design and work, as well as the gift, of Brother Geo. M. Lamb. The whole of the wood, which is pitch-pine, is to be varnished. The furniture is masonic in design.

The architect is Mr. W. J. Gray, Berwick; and the contractors were M. Gray & Sons, Berwick, for the masonry; J. Weatherson, for the plastering; Brigham & Co., Berwick, for the iron railing round the structure; T. Bickerton, Ayton, for the joinery; and J. Archbold, Berwick, for the plumbing.

STEER'S PATENT GRATE.

If a doctor cure you it is only fair to say so. We had a fireplace that troubled us, the smoke coming into the room, and damaging everything, and by introducing one of the grates patented by Messrs. Steer & Co., of Upper Thames-street, this has been remedied. We mention the fact for the benefit of others similarly annoyed. The patentees say,—"The object of this grate is to economise fuel and utilise heat: to obtain this, the grate is made to project from 4 in. to 6 in. before the chimney jamb, with side flues. The smoke and heat first rise to the top of the grate, and then descend the side flues, and pass away at the back in the usual way. The whole front of the grate is a heating surface, and a saving of 60 or 70 per cent. is obtained."

In the particular case to which we are alluding, we have not found the saving so great as is here stated, but there is a saving, say from 30 to 40 per cent.: we used to burn three scuttlefuls of coal a day, and now only burn two.

In some of the grates made under this patent a hot-air chamber is formed, so that fresh warm-air may be brought into the apartment from without. The difficulty in this arrangement,—a difficulty not peculiar to this stove,—is that of cleansing the air so introduced. When this is overcome a great thing will have been achieved.

We certainly think Steer's stove a very good invention.

ACCIDENTS.

The Fall of a Building at Bury.—The cause of the accident is said to have been the giving way of the centre beam, which ran from one side of the building to the other. On examination, the wood was found to present no appearance of rottenness, and was evidently broken by the weight on it, or with the vibration from the stamping of feet, and there being no pillar to support it in the centre. No blame, so far as we can learn, is attached to any one concerned, as it was never intended that such a meeting should be held in the room. An inquest is in progress.

Destructive Fire at Leith.—A fire of an extensive character, and entailing serious loss of property, has occurred at Messrs. J. Mitchell & Co.'s saw and moulding mills, Springfield, Leith Walk. The mills, when in full work, as they have been for some years past, afforded employment to between sixty and seventy men, and were fitted up with machinery. In little more than an hour after the commencement of the fire the range of shedding and mills had been entirely gutted, although for two or three hours afterwards the flames continued to burn in various parts of the ruined building. A large quantity of wood was got out of harm's way. The origin of the fire has not been ascertained, but as the flames were first observed to proceed from the boiler-house, it is supposed that some smouldering embers must have been the cause of the accident. As has been stated, the value of the entire property is estimated at 9,000*l.*, but only 3,000*l.* of this were insured. The logs of timber which were lying in the open yard were all saved. While a man named James Petrie was doing his best to render assistance, he fell from the roof of the burning building, and had his left leg fractured.

Chatham Dockyard.—An alarming accident occurred at Chatham Dockyard on Wednesday morning. About twelve o'clock the whole of the massive machinery in the metal mills was in full swing, when suddenly with a tremendous crash the monster fly-wheel of the engine broke. The wheel was of cast iron, and weighed nearly 35 tons. The pieces, from the great speed at which the wheel was revolving, were thrown in all directions, some of the fragments weighing as much as five and six tons,—one piece that weight being thrown a distance of nearly 30 ft., falling close by one of the workmen. One result of the accident will be that nearly all the work in this department will be stopped for four or five months.

THE TRADES MOVEMENT.

Wisbech.—The joiners and carpenters in this town gave notice to their employers that on and after Monday (the 9th instant) they should expect to be paid at the rate of 6d. per hour, and to work 56½ hours per week. If their request should not be granted, they said they would leave their work. The masters, to the number of twenty-one, met in the Corn Exchange on Monday, when Mr. Girling presided. The demands of the men were fully discussed, and it was unanimously resolved that no increase should be made in the rate of wages, they being as high as the district can afford to give, but that the reduction of time should be agreed to.

Bedford.—The journeymen painters have met at the Working Men's Institute to discuss the advisability of asking for an increase of wages and a reduction of hours. It was agreed that a conference should be held with their employers on the following Friday evening; that an increase of 1d. per hour be asked, and also a reduction of the number of hours from 58 to 56 per week. The wages paid at present vary from about 20s. to 28s. according to skill. It is in contemplation to form a branch of the Painters' Union.—*Bedford Times.*

Alloa.—The operative masons of Alloa, upwards of 100 in number, have come out on strike because the masters insisted on paying the wages fortnightly, with a "lie day," instead of weekly.

The Strikes in America.—The New York correspondent of the *Standard* writes:—

"Strikes continue epidemic, not only in the United States, but in the West Indies. From Havannah we have advices of the 21st, which represent the labour strike as still prevailing there, and that sailors on coasting vessels have combined to prevent the stevedores from working. Nearer home,—here in the United States,—we have premonitions of trouble: this both in Pennsylvania among the miners, and in Louisiana, as related last week, among the negroes. . . . . Trouble of a serious nature is feared. The National Miners' Union is rapidly completing its organisations, and meetings are held weekly. The union guarantees each member in good standing a sum sufficient to keep himself and family from want during the strike, and its treasury is said to be very strong. The Pottsville (Pa.) *Daily Standard* of the 18th says:—'There is no longer any doubt of the fact that there is a general suspension of mining operations in this region, and unless the Philadelphia and Reading Coal and Iron Company recedes from the firm stand it has taken, the cessation of labour will be protracted, and costly alike to this community and to the operators and miners.'"

TICKHILL CASTLE.

Tickhill is a place of high antiquity, and both before and for some centuries after the Norman Conquest its importance as a strong place and the head of an extensive lordship was very considerable. Mr. Hunter, the accurate and accomplished historian of the district, suggests "The-Wick-hill," in allusion to the village mount, as a probable etymology for the name, and cites "Thunder-cliffe," or "Th' Under Cliff," as an analogous case. It seems that near Sheffield Castle was as mall green called "The Wick-er," and "Ticken-hall," near Bewdley, was the seat of an early fortress.

Tickhill, however, though obviously an early name, is not recorded in Domesday, but is thought to be included in Dadsley, a name still extant in the immediate neighbourhood. In "Dadesleia, Stantone, and Helgæli," Elsi and Siward held eight carucates,—Roger de Buisli held seven in demesne; there were also thirty-one burgesses, a class whose presence has been held to indicate a burgh or castle. Roger de Buisli was tenant in chief of these and other manors, comprising the honour of Tickhill, a division certainly based upon an earlier fee, of which Tickhill was the chief seat. The Norman Honour numbered sixty-five and three-quarters knight fees, and extended from Yorkshire into the shires of Derby, Lincoln, Notts, and Leicester, including one manor in Devon. Tickhill, which seems to have been sometimes called Blythe, which, however, was also the name of a place in the adjacent part of Lincolnshire, was the chief seat of the powerful house of De Buisli during their somewhat brief career.

Roger de Buisli received Tickhill from the Conqueror, who erected it into an honour in his favour. Roger had a choice in his wide Yorkshire domains of three ancient English seats, Laughton-en-le-Morthen, Mexborough, and Tickhill. He selected Tickhill; and the two other sites retain their English earthworks, unaltered by Norman masonry, and changed only by time. Laughton seems to have been originally superior even to Tickhill, probably as the residence of Earl Edwin, being named in the Domesday Survey. Roger himself probably fortified Tickhill with masonry, the gatehouse and much of the wall being probably his work. The foundations of the shell-keep look rather later, but may also be of this date. He was also the founder of Blythe Priory, in 1088. He died 1098, and was succeeded by his son Robert, who died childless in the reign of Henry I.

The descent of Tickhill now becomes obscure. Roger had a brother Ernald, who held six fees under Tickhill; and a sister, Beatrix, from whom descended the Earls of Eu. On Robert's death, however, Tickhill was claimed by Robert de Belesme as the next heir; and, as he was powerful, and supported his claim by payment of a heavy fine, or bribe, he succeeded. On his death, however, King Henry stepped in, and took possession. The castle remained for some time, with some brief intervals, in the Crown. William Fitz-Godric held it in 1142, and Stephen, Earl of Eu, for a time. Ralph, Earl of Chester, had it in 1151-3, and Lacy of Pontefract. Henry II., however, seems to have settled it upon Eleanor, his queen, who founded the "Chapel of St. Nicholas within the walls."

It descended to Richard I., and in his absence was seized by Prince John, and besieged for Richard by Pudsey, Bishop of Durham. When John inherited it as king, he annexed his mother's chapel to the chapter of Rouen. John was frequently at Tickhill, which is remarkable, as there was no park or chase annexed to it. He was here six times between 1200 and 1216 for at least eleven days. Early in John's reign, however, the Earl of Eu, being powerful, claimed Tickhill as the husband of Alice, heiress of Henry Earl of Eu, and representative of Beatrix, sister of Roger de Buisli. Ralph de Issoudon, or de Lusignan, her husband, and earl in her right, in 1197, seems to have been son of Geoffrey de Lusignan, who was to marry a daughter of King John, in consequence of which the king agreed to restore Tickhill to Ralph and his wife, and John de Bassingbourn was ordered to give possession, which was supplemented by an order to the same effect, 1 Henry III.

Mean time another claimant appeared, in the person of Idonea, representative of Ernald, Roger de Buisli's brother, and who had married Robert de Vipont, a baron much employed by John, and not unfrequently in connexion with Tickhill. Thus in 1204 he was concerned in certain repairs at the castle, as also in 1206, which included a barn and stables. In 1207 he was to be paid for these repairs, and he was also employed upon the king's castles of Nottingham, Bolsover, the Peak, and Scarborough. In 1208 five dolia of red wine, such as would keep, were to be sent to him at Tickhill, for the king, Idonea, Vipont's wife, held by descent six fees in Tickhill, and now claimed the rest against Countess Alice, 6th Henry III. Alice had the best of it; but in 9th Henry III. she went abroad, probably to her Norman estates, and in consequence Tickhill seems to have lapsed to the Crown.

Henry III., when king, granted it to Prince Edward, who in 1254, settled it upon Eleanor of Castile, but in 1259-60, Edward de Lacy, constable of Chester, used the phrase "Baronia mea de Tikehull," as though absolute lord. Prince Edward, however, granted it to his cousin Henry, son of Richard, king of the Romans, in 1263.

In 1296, John, Earl of Eu, revived the family claim. He was grandson of Alphonso (son of John, king of Jerusalem), by a daughter of Countess Alice. His claim was speedily set aside, he being an alien. This was the last assertion of the right, but a century later it was

remembered, when Henry V. created William Bourchier Earl of Eu and Lord Bourchier of Tickhill, titles only, not connected with the property, which remained in the Crown.

In February, 1322, the castle was besieged for three weeks by Thomas of Lancaster, and this siege is one of the charges brought against him on his trial:—"Et misit homines suos . . . . ad obsidendum castrum domini Regis de Tikhull; et quædam ingenia, ad projiciendum petras grossas super castrum prædictum, et homines in eodem castro ex parte domini Regis existentes; qui quidem proditores castrum illud, per tres septimanus continuè insultando et debellando, obsederunt, et quosdem homines Regis ibidem interfecerunt." The castle was defended gallantly by Sir William de Anne, and relieved by the king in person. Tickhill was again settled upon a queen, in the person of Philippa, who died in 1369. In 1362, Edward exchanged Tickhill with John of Gaunt, against the honour of Richmond, and it descended with the other estates of the duchy of Lancaster. In the Parliamentary struggle it was held for the king, but surrendered after Marston Moor, and was dismantled. When thus held, it was defended in advance by the moat and by the palisades on the counterscarp. The foundation of the chapel was dissolved, 1 Edward VI. The castle now belongs to the Earl of Scarborough.

Tickhill Castle is an excellent example of a pre-Norman or English earthwork, composed of mound, fosse, and lower ward, converted into a Norman castle. It exemplifies exactly the manner in which the Norman engineers treated earthworks of this description, and how such works gave rise to one of the two great types of a Norman castle, that with the shell-keep. Tickhill is Laughton on a larger scale, the only difference being that the ditch of the mound is not carried wholly round it, but is wanting towards the attached area. Either it was never formed, or, what is not improbable, was filled up when the Norman works were constructed, or, as at Cardiff, at a much later period. Something analogous to this seems to have taken place at Kenilworth.

In the original construction of this fortress advantage was taken of a knoll of soft sandstone rock to form the base of the mound. This was scarped, and the ditch dug, and the material employed in forming the upper two-thirds of the mound. A modern cave in the side shows this natural base. The castle is composed of the mound, and a court or ward appended to its western side, the whole included within a ditch. The mound is conical, about 60 ft. diameter at its table-top, and about 60 ft. high, above the ward. The ward is a rounded and more or less circular area, save where it touches the mound, and includes about one quarter of its circumference. The exterior ditch follows the figure of this ward, and of the uncovered three-quarters of the mound: hence in plan it resembles somewhat a figure of 8, and it is this notch in the outline that makes it probable that the mound ditch was once complete, and the two parts of the fortress were, as at Barwick, distinct. The domestic buildings stood in the lower ward, on its western edge, opposite to the mound upon which was the keep. The gatehouse stands on the southern edge of the ward, between the domestic buildings and the keep. The curtain is broken down to the east, but elsewhere tolerably perfect. The ditch is filled up on the same side, and its place occupied as a kitchen-garden and by stables.

Upon the summit of the mound are seen the foundations of the keep, a decagon, the sides of which average 16 ft. 11 in., of which each angle was covered by a flat pilaster of 4 ft. broad, and very slight projection. The door seems to have been towards the south-west, of 4 ft. 6 in. opening. It lay between two sides of the exceptional length of 20 ft. The wall seems to have been, at the top of the plinth, 10 ft. thick. The shell was apparently faced with ashlar. The whole building has been taken down with some care to the top of the plinth, a mere plain chamfer, formerly about 6 in. above the ground, and now covered to its level. Thus the actual dimensions of the plan are preserved, and the position and breadth of the entrance. It is said there is a well within the area, a few feet inside the place of the door. If so, it is at present effectually concealed.

The keep at this time is ascended by seventy-five stone steps in a straight line on the western face. Possibly this was the original approach. If so, the path from the head of the stair must have passed for 20 ft. round the outside of the keep. The steps terminate below under the shelter of the curtain. The two ends of the curtain ascend the mound about two-thirds of its height. Probably they were continued to the summit, but no foundations are now seen at the keep level, and the plinth of the keep shows there was no bond. The curtains which thus ascended these mounds rarely were bonded into the keep, and do not seem ever to have risen to its full height. On the contrary, they seem to have only risen to the level of the top of the mound or those of the keep, the parapet probably being continued so as to stop the passage round its base. This seems to have been the case at Tunbridge, Berkhampstead, and Tamworth. At Hawarden the curtain abuts against the keep about 10 ft. high, but with no original bond, and with a doorway in it opening outside the base of the keep. The curtain which enclosed the lower ward is here from 10 ft. to 13 ft. thick, and 20 ft. to 30 ft. high, with a plinth at its interior base. It rises out of a bank which forms a ramp or terrace 15 ft. broad, on both outer and inner sides. Inside, this ramp is about 8 ft. above the court-level. Outside, it forms a walk all round the fortress, being carried by a bridge over the gateway, and in a step or notch round the slope of the mound. The curtain is entire from the mound to the dwelling-house, about 240 ft., along the north front, but to the west it is concealed by the house which represents the domestic buildings of the castle. It also remains from the house to the gatehouse, and about 50 ft. or 60 ft. beyond it along the south front. Towards the south-east about 300 ft. are gone, but the last 78 ft., where it again ascends the mound, are tolerably perfect.

Where the outer wall skirts the mound, it has on its upper side a revetment wall, 6 ft. high, and which may have been higher, and crested with a parapet to defend this front.

The exterior ditch is broad and deep, and in part contains water. Formerly it was fed from an adjacent stream, which flowed all round it. Beyond the ditch was a bank of earth, of which traces and portions remain, especially towards the north. It is difficult to say whether there was a second ditch, owing to the encroachments of roads and buildings.

The gatehouse deserves special notice, as an original and early Norman structure. It is 36 ft. square, with walls 7 ft. 6 in. thick, and has a round-headed gateway at each end, of 12 ft. opening, with a plain rebate for doors, but no portcullis or chamfer. The inner space was covered with timber, and there was an upper story. This may have been partially rebuilt; it contains in the wall over the inner door a large Tudor window, probably an insertion.

There is no staircase. The structure much resembles Porchester before the alterations. It is placed upon the curtain, with a bold exterior, and still bolder interior projection. The outer front of the first floor is ornamented with four stiff rude pediments, each a right-angled triangle, with a rude figure at the apex of each, and in the hollow angle or gutter, joining each pair. The tympana are filled with square blocks, each carved with an undeveloped dog-tooth ornament. A plain string marks the division of the two stages, and so far all is Norman.

But although the upper part is unaltered, the lower part has been marked by a Decorated gateway with portcullis groove and pointed arch, while in front of and flanking this arch two walls, 6 ft. thick, project 15 ft., and contained between them the drawbridge. Above and upon these, concealing the upper part of the arch of entrance, is a low flat bridge, which carries the exterior walk, or *chemin de ronde*, over the entrance, and from which the grate was worked. Had it not been for this bridge, and its Decorated connexions, it might have been supposed that the *chemin de ronde* was a mere modern pleasure-walk, whereas it is clear that it was a part of the defence, a work covering the foot of the wall, and no doubt strongly palisaded. There is no trace of a parapet.

The gatehouse seems Early Norman, probably with most of the curtain the work of Roger de Buisli before 1089. The keep looks later, but it must have been part of the original design, and possibly the works begun by Roger were completed by his son. In the Decorated period there were probably considerable additions. Probably when the gatehouse was masked, and the bridge thrown over it, the curtain also was repaired, and a new parapet added, and the *chemin de ronde* formed. Leland speaks of a hall, now gone. Where the chapel stood is not known. A door case which may have belonged to it has been removed and set up inside the gatehouse, and outside is an old oak door of the style of James I., on which are carved the words,—

"Peace and grace
Be to this place."

The entrance-way now leads up to the gatehouse across a modern bridge, over the wet ditch. To the south of the place is a tributary of the river Torne or Thorne, which covered the front.

This is one of the most curious castles in Yorkshire, not only for its pure Norman gatehouse, and the undisturbed foundation of its shell-keep, but because it shows how the Norman lords availed themselves of an English seat, and how their architects or engineers accommodated their defences to the already existing earthworks. It should be studied in conjunction with Pickering for the general plan and the Norman works, and with Barwick-in-Elmete and Laughton-en-le-Morthen for the general resemblance of the earthworks. Unfortunately there is no plan.

G. T. C.

SIR GILBERT SCOTT AND THE TURNERS' COMPANY.

ON Thursday in week before last an interesting ceremony took place in the Guildhall, London, upon the occasion of the presentation to Sir Gilbert Scott, R.A., of the freedom of the Turners' Company in recognition of the encouragement he had given in his professional works to the "art of turning in stone and marble." Professor Tennant presided.

Mr. J. Jones was the proposer of the resolution, and Professor Tennant said:—Sir Gilbert Scott, I have long admired the excellent taste displayed by you throughout the principal cities of England in restoring our beautiful cathedrals. It is with great pleasure that I admit you to the Turners' Company, which for some years has endeavoured to encourage the apprentice and workman in the various applications of turning. The company is also desirous of recognising the services of those who create the designs for the workman. In the Prince's Memorial in Hyde-park, the St. Pancras station of the Midland Railway, and in numerous churches and other public buildings you have introduced materials existing in large quantities in the British islands, and not surpassed by those of Egypt, Greece, or Rome, for beauty and durability. I allude more particularly to the beautiful porphyritic granite from Shap Fell, in Westmoreland. This is likely to take a place of equal importance with the other granites, syenites, porphyries, serpentines, and marbles of the kingdom, thus extending largely the employment for the turner.

Sir Gilbert Scott, in acknowledging the honour conferred upon him, said,—I thank you, worshipful master, and all the gentlemen present, for the honour you have so kindly done me in electing me as a member of your ancient and honourable company, and yourself, sir, with Mr. Jones, for the very flattering terms in which you have informed me of my election—terms, I may say, far more complimentary than I deserve. I feel great pleasure in being admitted into any of the ancient guilds of the City of London; but more especially one, like your own, which represents one of the arts connected with my own profession of architecture. The art of turning has, from the earlist ages, been one of the means made use of in the production of architectural forms. I do not know whether it may be proved, but I have no doubt that it was in some way resorted to in working the enormous columns of granite and other materials still remaining in Egypt as well as those of later date in Greece. It is known that it was by a process similar to turnery that those wonderfully close joints, which are seen in the columns of the Greek temples, have been formed. The stones were first worked with the utmost degree of accuracy attainable by hand, and then one being placed upon another with the finest sand between, the upper one was turned on its axis till the joint was wrought to that unequalled degree of fineness which we now see. I have recently noticed at Pompeii, in columns which are of a late variety of the Grecian Doric order, the marks of the tools by which the echini beneath the abaci of their capitals were turned still perfect and distinct. In our own Anglo-Saxon architecture, the baluster columns which form so marked a characteristic of the style, and of which I have found many quite entire, bear marks of the turning tools, and of the centres by which they were fixed in the lathe. Later on, we have the same proofs of the turner's art in our Mediæval buildings, while much of the

furniture of those periods was composed largely of turned portions. In the Cathedral at Hereford there remains a bishop's chair of the thirteenth century, which is almost wholly composed of turned parts fitted so as to form an excellent design. In modern times, we know what strides this art has made, from the mighty shaft of iron which communicates the motion from the engines of the man-of-war and the screw at her stern, to the exquisite ivory turning, which, next to actual carving, produces some of the most charming forms of ornamentation. The master has alluded to the uses made of turning in working granite columns, &c., and there are an infinity of other forms in which it is applied in modern architecture. I cannot call myself a turner, though I was, when a boy, a dabbler in the art; I can say, however, that I was at one time intimately acquainted with all its finest and most intricate processes, owing to an uncle of mine (the Rev. Samuel King—himself a member of one of your ancient City guilds) having been probably, in his day, the best turner and the possessor of the finest and most perfect turning apparatus in the kingdom, and from having consequently had opportunities of watching all the most delicate processes of the art. I ought to add an expression of my gratification at finding that this ancient company, long perhaps severed from the art whose name it bears, has nevertheless returned to its own proper traditions, and become the patron of the art which its members formerly practised. I heartily congratulate them on this, and wish every success to their encouragement of the art.

ON ORNAMENTAL DESIGN.*

THE works in ornamental design carried out in Paris, under the directions of MM. Percier and La Fontaine, present to us a new treatment of ancient art; the luxuriousness of the Roman style is eschewed, and Greek of the stiffest and coldest type is introduced. . The works of these two men bear witness to the zeal with which they prosecuted their favourite style; their drawings are full of grace and refinement, and might be taken as examples of perfect draughtsmanship. After the extravagancies of the Louis Quatorze, Quinze, and Seize styles, it was but natural that the tide of art should change; the feeling that prompted the erection of a temple,—"Aux grands hommes, La Patrie reconnaissante,"—had to look to Classic times for a prototype. The direct imitation of antique forms is never a very healthy sign in art, and this style of the First Empire, as it is called, had soon to throw off its archaic stiffness. This style rivalled in trophies of arms, winged Victories standing on globes, candelabra, sphinxes, terminals, and such-like accessories.

Some years ago there was an excitement about a new style of architecture. I have seen some works published on the subject, and must say that nothing could be more disappointing than the results. I conclude that the new styles of ornament to decorate them would have been equally bad. We ought to be very thankful that such a dreadful conglomeration as Gothic form with Classic detail was never tried in these countries; such cross-breeds in art are not to be tolerated. One church, like Sainte Eustache, in Paris, is quite enough.

The arts of the Renaissance style are to be seen in perfection at Venice. There is of course a great deal of good and a large amount of bad ornament, so you will have to make a careful selection. The Scala dei Giganti, in the Ducal Palace, is ornamented with much refinement; a chimney-piece in the Ducal Palace also deserves careful study. Several of the palazzi are also refined in their decorations. As examples of the light and delicate style, the Church of Santa Maria dei Miracoli offers ornaments that grow gradually and gracefully out of each other—a general principle in ornamental design when good; but when we see on the top of a light and elegant composition a heavy basket of flowers, we have a great inclination to pluck it away as an incongruity, yet this is exactly what appears in some of the ornaments in this same church. I think that such ideas as dolphins turning into cornucopiæ on the flowers in which birds are perched, and such like extraordinary combinations, are unpleasing. The arabesques designed by Pintelli for the Church of St. Agostino, Rome, are very gracefully and well designed, and grow gradually from the parent stem. In Pintelli's work we may see great elegance and refinement. In Renaissance ornament the centre line is often widened out to form vase-like excrescences, and also from it foliage may spring to make up the gaps. Some of the panels in the Church of San Michele in Murano are well worthy of adaptation; very often a tripod or other vessel forms the base, from which the centre stem springs, and off it the foliage grows; often heads with beards turning into foliage are introduced.

In good ornament a pattern should never be arranged so as to give you the effect of objects hanging exactly contrary to the fixed law of gravitation. What I refer specially to is the instance of an upright panel divided in two by a circular boss in the centre; from it, above and below, springs an arabesque pattern; from the curved foliage blossoms hang: this will be all right for the upper portion of the panel, but when you come to the lower one you find your treatment will not answer, and that naturally-hanging objects must be expelled from your design. I have seen such a panel as I have mentioned to you in execution, and the effect, I assure you, was highly objectionable; it is quite as bad as scrolls being cut short to fill panels of a certain length. You could understand the possibility of such an expedient in room-paper, but I have seen the process repeated in oil-colour to imitate it; so dangerous is the result of a bad example. Frequently on the centre line is suspended a panel for inscriptions: this has a very graceful and good effect; birds are often introduced hopping naturally on the foliage, picking at berries on foliage springing from the principal curves. Acanthus-leaves are frequently turned into lions' claws in Cinque-cento ornament. Many of the ornaments of the Renaissance were infinitely superior to the clumsy and ungraceful overgrown acanthus inventions of the late Roman work. Some of the most beautiful Renaissance work is to be seen in the choir of a church in Perugia, executed by Stefano di Bergamo, from designs by Raffaelle. In the best periods of the Renaissance the ground was not too much covered with ornament, which gave a great amount of repose, unattainable by other means. Many of the ornaments used by the Renaissance artists were unsuitable for ecclesiastical purposes; but, deprived of its tripods, altars, terminals, bulls' heads, and other remnants of a false theology, and confining the ornaments to nature and truth, this objection is entirely averted.

The Elizabethan ornamental designs have a great mannerism about them, but are frequently gracefully and well designed, though whence the "motif" was procured it is very often hard to see; in most cases I fancy it took its rise in the unbridled imagination of the designer. That many of the ornaments were taken from the printed books of the period, there can be little doubt; they abound with a large amount of the most extravagant ornament in this style. Any effect these patterns may have is greatly aided by a repetition of graceful if often unmeaning forms; nails, draperies, trusses, curves joined by lines, and hosts of other elements, are put under contribution by this style. The notion of covering the lower part of a column with arabesques, and fluting the upper portion, was quite a feature of the Renaissance revival. At Pompeii the same idea prevailed of having the bottom part plain, and colouring it differently from the upper portion, which was often fluted; by this arabesqueing and fluting much apparent strength was frittered away. The banding of columns, too—which, if done sparingly, has such a good effect—became so excessive that gradually the column disappeared, and bands only were to be seen; the pedestals, too, on which the columns rested were in the Elizabethan period panelled so as to leave but a very small amount of plain surface. The panel formed by having an oval in the centre, with the axes continued till they meet the sides, was a very frequent form. The designs for ceilings were bold geometrical ones: of these, those at Bramshill, Hampshire; Dean, Northampton; and the strange one at Broughton Malherbe, are good examples, which you will find illustrated in Mr. Shaw's work on Elizabethan Architecture.

Though it was not till the close of the fifteenth century that the Gothic style waned in England entirely, it had by that time worn itself out in the extravagance to be seen in Henry VII.'s Chapel, Westminster Abbey. The elaboration of its system of fan-vaulting and pendants almost approached the Rococo, and the mouldings and ornaments had become weak in the extreme; it was then that Torrigiano, who had been brought to execute the monument of Henry VII., began the work of the Classic revival in England, which gradually gave Elizabethan art its origin. Torrigiano was not the first Italian who had come to work in Westminster. Peter, of Rome, with his companions, Odericus and others, were brought from Rome by Abbot Ware in the reign of Henry III. to construct the magnificent shrine of St. Edward,—a work that occupied ten years in its completion. In this relic the Byzantine guilloche ornament and other Byzantine elements are elegantly mingled with Gothic forms which had been taken from windows in the Abbey. These same workmen, I would conclude, also constructed the tomb of King Henry III., for which Edward I. brought home beautiful slabs of marble from the East on his return to England from the Crusades. This tomb, with the exception of the effigy, is entirely Byzantine in character. The beautiful pavements in the Chapel of St. Edward, and in front of the altar, were also produced at this period; the style, however, did not extend in England. These mosaic works of Westminster Abbey, though much destroyed, bear sufficient evidence, even in their present dilapidated condition, of their equality with anything of a like style in Italy. I think it a disgraceful thing that the royal monuments of a great country like ours should be allowed to remain in such a state of dinginess.

Albert Dürer greatly influenced the arts of the Renaissance in Germany; his powers of ornamental design were great indeed. You have only to look at his beautiful designs for the borders of a prayer-book to know how great an inventor he was. Some of his religious designs would seem to us inappropriate, but this drollery was very general in German art. Dürer could draw so many things well, that ornamental design was an easy matter to him.

The leaf ornaments and others of the Byzantine and Romanesque periods are well worthy your attention. The general simplicity and boldness of these patterns is much to be admired. The purest work of the Byzantine school is to be found in the church of Santa Sophia, at Constantinople; it was the Oriental manner of treating Classic details that gave rise to this style. This school of ornament was very abundant in its results and influences, the Byzantine gradually working into the Romanesque. The patterns are sometimes very ingeniously interlaced; their foliage partook more of the nature of the thistle than the acanthus, and was frequently indented with a deep angular cut: you may sometimes see patterns merely matted.

In the Romanesque period the variety of the ornament was very great; supports in this style were not frittered away with a superfluity or too deep sinking of ornament. The introduction of interlaced fabulous animals, after the manner of the Celts, is also remarkable.

In our Early English period the conventional ornament is very pleasing, and the effort that was always made in the best period to show the stalk well in the capitals is much to be admired; like every other style, it loses much of its effect by mere copyism, as I have seen in some churches exact copies, as to their details, of existing examples, but this was done at the time when everything in the Gothic way should be supported by authority, like the similar era in Classic art, and works were considered perfect in proportion to their closeness of resemblance to some existing example. In the Decorated period leaves were more closely copied, while in the Perpendicular period they assumed a lumpy angularity, neither conventional nor natural.

The adaptability of Celtic ornament to ornamental design is very great; its construction should not be too intricate or crowded, as that often has the effect of confusing the work. For the truth of the assertion that it has got quite a grammar of ornament of its own, I would refer you to Mr. O'Neill's excellent work on the Ancient Irish Crosses. That the origin of many of the ornaments on these crosses was pagan I have no doubt; that the crosses themselves were Christian, is, I think, equally certain. When Christianity was proclaimed to the early inhabitants of these countries, and symbols of man's redemption were erected as memorials of the departed and edifying to the living, the ornament of the natives, though pagan in its character, was used to decorate them. As in early Christian times, in Rome and elsewhere, the architecture of the pagan was used until the Christian religion ultimately developed the Byzantine style for itself.

* From a paper, by Mr. Thomas H. Longfield, read at a meeting of the Architectural Association of Ireland, as mentioned in our last.

THE LANDS CLAUSES ACT.

INSTITUTION OF SURVEYORS.

AN ordinary general meeting of the members was held on Monday evening, the 2nd inst., the president (Mr. E. Norton Clifton) in the chair, when the discussion was resumed and concluded on the paper which was read some short time back by Mr. Philbrick, Q.C., on "The Lands Clauses Consolidation Act, with some Suggestions for its Amendment." *

Mr. Marriott, in re-opening the discussion, said that the meeting was called upon not so much to give expression to their views, upon which they were agreed, as to those upon which they did not agree. With regard to the tribunal, which was suggested to be established for cases under the Lands Clauses Act, the tribunal was either by jury or arbitration; and, in discussing the merits of either mode, it was necessary to consider the limits of the Act, and to bear in mind its character when it was passed, and what was its meaning. In the year it was passed (1845) the landowners were strong, and different companies, though powerful, were not so much so as now. In desiring to obtain amendments it was not advisable to struggle for anything that an individual might particularly wish for; but some practical amendments, that would have a chance of passing the House, should be considered. He was in favour of the system of juries, for he conceived that pathology and physiology were sciences as deep as that of land surveying, and juries had often to decide cases relative to those sciences; and even, also, in the matter of patents, juries were called upon to settle disputed questions in this respect. If it were attempted to go to Parliament to abolish the system of juries, he did not believe the attempt would be successful, as the proposed abolition of the system would be found to be impracticable. The proposal which had been urged to have a tribunal to give its attention specially to cases under the Act, in the place of juries, he did not agree with. Judges, he thought, should not be confined to any one subject, as it tended to narrow their views. As a rule judges, mixing with each other, and exchanging ideas, were very large-minded men, and generally gave satisfaction in discharge of their duties. The tendency in England was now to dispense with special courts, because the tendency of such courts was to narrow the minds of the judges. He believed that, if a court were established such as that which had been suggested, there would be nothing left for the judges to do. With regard to the law costs, it was desirable that they should be settled more definitely than they were at present. The 92nd section of the Lands Clauses Act pressed hard upon companies in this respect. The question of costs, he thought, should be kept entirely from the view of the jury. In conclusion he said that, with regard to the Act, he was of opinion that it would be best to let well alone.

Mr. J. Clutton believed that, from a surveyor's point of view, the Act had been a good one, and had proved very valuable, not only for companies, but also for claimants. Trial by jury was very popular, and was the wisest tribunal before which a case of figures could be brought. The clause, however, in the Act, respecting arbitration, he did not think was as good as it was intended to be. It would be desirable, he thought, in large cases, that the umpire and the arbitrators should sit together; and if some amendment could be made, under the 92nd clause, it would be an improvement. He was of opinion that the arbitrary scale of 10 per cent. should not be strictly enforced in every case: this question was a difficult one to deal with, but he had always considered that it should be taken out of the hands of arbitrators to fix.

Mr. Ledgard was entirely opposed to there being any appeal from the decisions arrived at by arbitrators in compensation cases. Although cases of hardship might arise, he thought that, practically, great benefits were derived from submitting cases to a tribunal of arbitrators. The great principle of arbitration, as it at present stood, was its finality, and this was a desirable object to be attained. He could not think any good would be derived from having an appeal from the arbitrators' decision, and no better tribunal could be found, he was of opinion, than that of magistrates. After objecting to the hard-and-fast line of 10 per cent. as an allowance for compensation, he concluded by observing that the practical working of the Act had been of the greatest utility; and little should be done, he considered, respecting the amendment of the Act unless absolutely requisite.

Mr. Shaw fully concurred in the wisdom of preceding the assessment of damages by the settlement of liabilities.

Mr. Kerr said that there were two great divisions of the question—one with respect to the law, and the other with respect to its practice. As regarded the former, he thought that many of the surveyors present were well able to advise lawyers; and respecting the latter, he believed by far the greater number of questions raised were questions which surveyors could settle for themselves without an alteration of the Act of Parliament.

Mr. Stephenson had done all he could to do away with the usage of the allowance of the 10 per cent. in compensation cases. Tenants from year to year, in many cases, suffered considerable hardship, some of them being removed for the convenience of public companies, receiving but a mere dole of compensation. When, however, a portion of a person's land was taken, the benefits which sometimes accrued to it should not be ignored.

Mr. Philbrick, in reply, said that he had no idea that his paper would have elicited so much useful and friendly criticism. The Institution of Surveyors, he thought, were to be congratulated upon the tone the discussion had taken. Attention had been called to the difference between the effect of the Lands Clauses and the combined operations of the Lands Clauses Act and the Railway Clauses Act; and if that had been the subject of their discussion, much that had been said would have been quite relevant. Considerable divergence of opinion, however, had been expressed on many of the points raised, one of these being regarding the allowance of 10 per cent. He thought it should be known that although 10 per cent. was the amount of the compulsory percentage ordinarily allowed, yet, with regard to land, 25 per cent. was the ordinary amount. He did not recollect that he had laid it down that there must be in any case a compulsory percentage; still more that it should be limited to a hard-and-fast line of 10 per cent. In some cases, 5 per cent. would not be too little to allow; and in other cases 10 per cent. would be an exorbitant sum. Regarding the court of appeal, it had been truly said that in all cases one of the desirable elements was the finality of the proceedings under the present conditions; and another desirable element was promptness. If they obtained a reasonably good tribunal; that did not afford an instance of "the law's delay;" they might put up with a small amount of injustice for the sake of securing a fair and prompt decision. Any Act was greatly to be deprecated which enabled either party in a case to throw obstructions in the way of another by harassing them or by causing them a tiresome and expensive litigation. As at present constituted, considerable delay would be caused if, after the compensation had been assessed, a public body declined to pay the amount. In venturing to suggest another tribunal, he pointed out that the present tribunal did not so thoroughly deal with the case as one specially charged with the duty might do. It was difficult to limit a right for compensation even if it should be limited at all. Where a person had a claim there should be a clear and certain right shown to that claim, which ought not to depend upon the prejudice or passions of a tribunal. With respect to costs, he perfectly agreed that, as a rule, when a person had established a right against another, he should not have to put his hand in his pocket to obtain by law that which another fairly withheld from him. In the case where property was taken from a person by compulsion, he thought that all costs which were incurred in investigating the claim, should be borne by the party taking the land. It had been suggested that persons having short leases were hardly dealt with; but it was worth a person's while, rather than lose his business, to give a little extra sum to stay in the business; and if he was turned out he would be deprived of renewing his lease; and these interests should be considered and fairly dealt with.

* See pp. 44, 64, *ante*.

Michelangelo.—It is intended to celebrate at Florence on the 6th of March, 1875, the 400th anniversary of the birth of Michelangelo Buonarotti. The committee appointed for the purpose are desirous of forming as complete a catalogue as possible of the works of the great master remaining in Italy or dispersed abroad.

MR. AITKEN'S BIRMINGHAM REPORT ON THE VIENNA EXHIBITION.*

IT was Mr. Aitken, the author of the report under notice, who accompanied the ten Birmingham artizans selected for the Local Chamber of Commerce, and other artizans associated with them, to Vienna; and now his own excellent report to the Chamber has been issued in a printed form. It treats of a great variety of subjects related to the Birmingham manufactures and those of England generally.

In the general report he says:—The wealth, power, energy, and industry of a nation are not best represented by its works in gold or silver, gems, &c., or its possession of mines of these metals, or precious stones; it is in its iron, and the coal with which it is smelted, the ability on the part of its people to convert the ores of iron into metal, and thence again into the thousand forms given to it, that the true wealth of a nation consists. Far, far ahead of every other nation is England; her production of iron may be said to equal that of all other nations put together. In 1871 the quantity of iron produced in England was 6,627,179 tons. France may be estimated at the same period as producing 1,500,000 tons (a very considerable quantity of which was made from imported ores); Belgium, 1,000,000 tons; Germany, 1,500,000 tons; Austria, 864,000 tons; Spain (1867), 125,242 tons. Russia, with rich mines of iron, produces but 400,000 tons annually; America, 2,000,000 tons. The produce of iron in Norway and Sweden is comparatively small. In proportion to the magnitude of its industry in iron, the iron of England was imperfectly represented, save in its manufactured conditions; chiefly then—as engines and machinery in the Machine Hall,—all the examples were exquisitely finished, good and true work, such as English engineers delight to, can, and do send out.

In the Manipulation of large Masses of Iron, England stands first.

In the power of manipulating immense masses of wrought iron, England exhibited a matchless example. In an armour-plate, to cover a portion of one of the turrets of the Prussian armour-clad *Bernossia*, the plate is 20 ft. in length, 6 ft. 10 in. in height, 10 in. in thickness, and bent to a radius of 13 ft. 6 in.; when taken from the furnace, it weighed 33 tons. In its finished condition, perforated for the cannon which it is intended to shield, it weighs 24 tons 5 cwts., and was produced by Charles Cammell & Co., Sheffield. Portions of armour-plates are also exhibited by John Brown & Co., also of Sheffield, which weighed 25½ and 26½ tons; proving that, in dealing with large masses of wrought-iron, England is unequalled. One of the great lessons taught by the Vienna Exhibition is, that *the future of iron is steel*, its conversion into steel, to be used instead of iron. Hundreds of examples of the converted metal applied to purposes where iron was formerly used, demonstrated the discoveries and progress made in metallurgical science, and their practical application to industry in iron, in converting it into its more valuable state as steel, better fitted for tear and wear, and purposes for which iron was formerly exclusively used.

To England is due all the great Improvements in Smelting Iron and cheaply converting it into Steel.

This change is chiefly due to English inventive skill; the fuel, except where wood is used, smelting furnaces, and machines employed are all of English origin, results of the discoveries of Dudley, the inventions of Cort, of James Watt, who supplied the power of steam to aid in the manufacture of iron, of Nasmyth, Sanderson, Bessemer, &c. If we are indebted to other countries for aiding us in imparting to our ornamental manufactures the graces of art, that benefit has been a thousandfold repaid by those countries assimilating our discoveries in reference to the smelting and manufacture of iron, the means by which they have been and are gaining ground upon us, as shown by the examination of their yearly increasing returns,

* Report presented to the Council of the Birmingham Chamber of Commerce on manufactures similar to those of Birmingham, represented in the Universal Exhibition held at Vienna, 1873; with remarks on the necessity for increased facilities in art education, museums of art objects, industrial scientific instruction, &c. By W. C. Aitken, the representative of the Birmingham Chamber of Commerce, who accompanied the artizan reporters selected by the Chamber to Vienna. Published by the Birmingham Chamber of Commerce.

lessening the previous very great disproportion between their and our own total annual production, further indicating that in a few branches they have gone so far ahead as to rival, if not excel, us in quality and cheapness of production. In addition to taking advantage of English inventions, other countries possess the advantage arising from cheap labour; but the English workman is physically stronger, all other conditions being equal, capable of doing more actual work in the same number of hours than the foreign.

Allusive to the Birmingham manufacture of gasfittings and chandeliers, the Report says:—

The extent and importance to which the manufacture of chandeliers and other fittings for gas has arrived in England, especially in Birmingham, of late years, render the display of those exhibited in the Vienna Exhibition by other countries of much interest. As at Paris in 1867, what is exhibited on the present occasion had all the characteristics which distinguished them there; if possible, their ornamental features were even more prominent. Unfettered by little conventionalities, the Continental designer ventures into paths which English designers of similar objects hesitate to tread. The former knows the whole history o ornament, is familiar with it from his earliest years; his resources are therefore more extensive, and he does not hesitate to dash in a graceful bit of ornament, even if it differs in style from that in which the chandelier as a whole is required or executed. This freedom is encouraged by the magnitude of the chandeliers made on the Continent for large establishments for business purposes—more so, for those in which refreshment, relaxation, amusement, or pleasure is sought. Four, six, or even eight ordinary English chandeliers "rolled into one" but faintly conveys an idea of an Austrian, German, or French object of the kind made for lighting music-hall, *café*, or *restaurant*. To the freedom of design additional brilliancy and splendour of appearance is given by leaf gold, powder bronzes of various hues, colours, and burnishings on the brass, where it has been used,—that metal however, in large and even in small examples, is comparatively little used (that is to say, zinc cast into metal moulds, or sheet zinc, iron, or even in sheets cleverly cut out and stamped in dies, or beaten into form, is very frequently taken advantage of, out of which to form the ornamental features), brass being confined only to the tube which forms the branches, or arms, and the connecting parts. It may here be remarked that Continental gasfitting manufacturers appear to make a better use of English-made "Fearn" ornamented tubing than the gasfitting manufacturers of the country which supplies the former with it; and in metal chandeliers there is advantage taken of far more glass, to increase brilliancy of effect by the introduction of pendants, or "drops," than in England; our scrupulous stickling for the "correct thing" simply resulting in infinitely better work being rejected because overpowered by the surpassing brilliancy of inferior, but far more showy examples, and it may be added, for reasons already given, really more attractive. On the other hand, taps that "jump" on being turned, joints, the inferior fitting of which is largely dependent on white lead, or soft solder (for preventing the escape of the subtle fluid, gas), contrast, so far as mere workmanship and practical usefulness is concerned, very badly with English examples, the majority of which have taps which work sweetly, joints secured to internal bodies, taps attached to "arms" by means of hard solder, also tight and well-made ball joints. Having already pointed out the stronghold of foreign gas chandeliers, *i.e.*, the brilliancy of their *tout ensemble*, and the means by which that feature is secured, it will easily be understood why, to the eyes of many Continental purchasers, the English gasfittings exhibited seem tame in comparison.

On the subject of industrial education and its advantages, Mr. Aitken says,—Wherever compulsory education exists, leading up to scientific technic instruction, as in Austria, Germany, &c., by reference to the annual returns of their industries, it will be found there is a growing increase. Such education means increased national prosperity; it means not only that,—*it means elevation of the public mind, higher thoughts, and nobler aspirations.* A nation like our own, blessed with abundance of raw material and the best of artizans, most skilful in manipulation, but comparatively *uneducated*, competes unsuccessfully with another nation where even a considerable proportion of the raw material is imported, but manipulated by educated artizans (as those at the Creusot, guided by their *more highly* educated superintendents), trained in such institutions as France, Germany, and Austria possess, the latter in the Royal Polytechnic Schools at Vienna and at Brunn; all the education in these countries leads up to *practical usefulness;* the education given is not an abstraction, it points to and prepares *for the business of life.*

The care evidently bestowed in illustrating the lessons given in Elementary Trade Schools, in Technical Institutions, or University, on the Continent (Austria, &c.), is illustrated in the Vienna Exhibition in the class of exhibits which embraces within its limits all objects used in education, teaching, and instruction. Within the Exhibition grounds were also buildings as school-houses, furnished with every appliance for teaching, which illustrated the care bestowed on education generally, and industrial and scientific education, in particular, by foreign countries and states. "Ignorance may walk in the path dimly lighted by advancing knowledge, but she stands in dismay when science passes her, and she is unable to follow, like the foolish virgin having no oil in her lamp." It is to be hoped that England is now beginning to trim her lamp; the oil is not beyond the means of purchase; its price, *study* and *application*, embracing the means of scientific instruction provided, imperfect as these, may be, *are*, up to the present time in England, in comparison with what they are in other countries.

"ELMSLEIGH," LEICESTER.

THIS house, the residence of Mr. John Stafford, J.P., is situated about a mile and a half from Leicester, upon the London road. The site commands beautiful views of the surrounding country, and is in proximity to some fine elm-trees, which are always valuable in preventing a nude or raw appearance round a new house. The existence of these trees suggested the name given to the house.

The vestibule, 9 ft. square, opens into an entrance-hall, having a waiting-room with lavatory and water-closet on the right; beyond which is the staircase-hall, 23 ft. by 20 ft., two stories in height, having a gallery leading to the bedrooms, and lighted by a lantern-light. Entering from this hall are the library, 19 ft. by 15 ft.; drawing-room, 31 ft. by 19 ft., with conservatory adjoining, connecting the two rooms; breakfast-room, 20 ft. by 18 ft.; and dining-room, 26 ft. by 19 ft. The breakfast-room is connected with the billiard-room by a glazed arcade, roofed with glass, and having an entrance-door from the gardens.

A corridor on the left leads to the domestic offices, having on the right a store-room, 17 ft. by 14 ft., fitted with strong-closet; and on the left a butler's pantry, 17 ft. by 13 ft.; beyond which are the kitchen, 22 ft. by 19 ft., with cook's pantry and scullery, 19 ft. by 15 ft. The billiard-room, lighted from the roof in addition to the windows, is 28 ft. by 19 ft. 6 in., with water-closet and lavatory adjoining. The kitchen court is surrounded on two sides with outbuildings, containing laundry, wash-house, boot-house, and places for wood, coals, and ashes.

On the first floor are four principal bed-rooms, two dressing-rooms, five ordinary bed-rooms, bath-room, housemaid's closet, and water-closet; in addition to which, and over the kitchen offices, are four maids' rooms, box-room, and water-closet. The upper story of the tower is made into a smoke-room, and commands an extensive view over the adjacent country.

In the basement are dairy, wine and beer cellars, larder, &c.

The external walls of the house are faced with white Diseworth bricks, with red stone dressings from Alton. The roofs are covered with blue Welsh slates, relieved with bands of green. The staircase is of wainscot oak, with pierced balustrade and newels. The library is fitted with oak panelling, with a parquet floor.

The doors and casings to the principal rooms are of pitch pine, with linen panels, French polished.

The contract for the house, including conservatory, was 6,500*l.* Messrs. William Neale & Son, of Leicester, have carried out the works, from the designs and under the superintendence of Messrs. Picton, Chambers, and Bradley, of Liverpool; Mr. R. Beaver, of Leicester, acting as clerk of the works.

DELHI CLOCK TOWER.

THE Municipal Commissioners of Delhi have effected many improvements in that city since the mutinies: the streets are now amongst the cleanest and best drained, and repaired, of any native city in the upper provinces. A town-hall, with a ball-room, museum, lecture-room, durbar-hall, measuring 80 ft. long and 40 ft. wide, and an extensive Serai for the accommodation of native travellers, may be specially mentioned amongst the works that have been constructed by the municipality. Trees have been planted along the road sides; cast-iron pillars from England have superseded the old wooden posts that formerly supported the street-lamps; large tanks have been constructed; and new gardens have been formed.

The latest improvement is the new clock-tower, which stands in the centre of the Chandnee Chowk, opposite the town-hall. Of this a photograph is given in "Professional Papers of Indian Engineering,* and from that we have prepared the accompanying engraving.

This building is erected on an appropriate site at the crossing of four streets, and stands 110 ft. high, exclusive of the gilt vane and finial. The lowest story is about 20 ft. square externally. The materials used in its construction are brick, red and yellow sandstone, and white marble. The capitals surmounting the main corner pillars are 4 ft. 2 in. wide at top, and 4 ft. 6 in. deep; they are carved out of solid blocks of white sandstone, and each of them weighs about two tons.

The dials of the clock are sufficiently elevated to be visible from the East Indian Railway Station, and from other prominent points in the city. The clock is constructed to work five bells, placed in the open canopy above it; these give out a different peal for each quarter, the largest bell striking the hours.

The building was completed in eighteen months, at a cost, including clock and bells, of 28,000 rupees, the whole of which amount was provided from municipal funds.

The tower was designed and built by Mr. E. J. Martin, Executive Engineer, Rajpootana State Railway, and the clock and bells were supplied by Benson & Co., Ludgate-hill, London.

The following was the specification for,—

The Clock and Bells.

The bells to be fixed above the dials, with a clear open space round them, in order to let out the sound. The hammers to be very strongly screwed to the beams of the bell-frame, the largest hammer to the largest bell, care to be taken that they do not touch the bells when at rest, but yet give a good firm blow when in action. The bell-frame to be constructed as shown on plans, with a sufficient space between it and the walls to afford room for the descent of the weights.

Immediately below the bell, and on a level with the centre of the dials, will be fixed the bevel-wheel work.

Behind each dial screwed to a shelf, will be placed one of the motion works, communicating with the bevel-wheel work by a rod. Below this will come the movement of the clock, raised above the floor on a stool about 3 ft. high, and connected by a rod with the bevel-wheels above. The single hammer-tail at one end of the clock should then be connected with the largest hammer, which strikes on the largest bell (No. 5). The hammer-tail at back of clock (the back of clock is where the pendulum swings), will be connected with No. 4 bell; the next tail to it with No. 3, and so on.

The hour-striking part and the going part each takes 48 turns to go for eight days, the chime part 75 turns. Double lines should be used as shown on diagram. The striking part takes one 8-inch weight, and 4 shifters, the going part a small weight, and 2 small shifters, the chime part one 8-inch weight, and 9 shifters, as 75 ft. cannot conveniently be obtained for the fall of the quarter weights, this part of the clock will have to be wound twice a week. A distance of 50 ft. down which the going and striking weights can descend, will be sufficient to enable those two parts to perform for eight days.

MEMBERS' SOIRÉE: ARCHITECTURAL ASSOCIATION.

THE evening of Friday, the 6th inst., brought together a roomful of members to the annual secret conclave. Happily no very binding oaths are exacted of those not blessed with a passion for delitescency. It may therefore be stated that the shows were approved, the laughter involuntary, and the squib at things professional,—not without wit, nor wisdom. It might indeed be remarked by a too critical person, that if the eccentrically costumed "Perfect Candidate" (labelled Pseudo Queen Anne) has not yet found his feet, the foothold of the other candidates ("V. Orders" and "V. Periods") seems very precarious. But surely this is not also the intention of the allegory!

* No. VIII. Edited by Major A. M. Lang, R.E. Printed and published at the Thomason College Press, Roorkee.

Plan of Ground Floor.

"ELMSLEIGH," LEICESTER.—MESSRS. PICTON, CHAMBERS, & BRADLEY, ARCHITECTS.

DELHI CLOCK TOWER.——MR. E. J. MARTIN, ARCHITECT.

MIND AND MECHANISM IN WORKMANSHIP.

MODES and methods in art and handicraft are undergoing rapid transition, accelerated by the instrumentality of mechanical appliances and the division of labour. So long as the supply of the rough material is afforded from the bowels of the earth in sufficient quantity for the ever-increasing demand, further mechanical agents will be introduced, and still further divisions and sub-divisions of man's labour will take place. The obvious tendency of this state of things at first sight appears to lead to cheapness and plenty, and to place luxuries in the future in the hands of the many, instead of as in the past, when they only reached the hands of the few. To the mind of the present age the future disturbs little; but if there be one more serious problem than another, it is that connected with population and its increase. We may succeed in making two blades of grass grow where only one has grown before, and nearly double our present corn-crops, but we never can make two acres out of one, or double the area of any of the British Isles. Population everywhere, and particularly at home, is increasing with a marvellous rapidity, and the food supply, though, perhaps, ample enough still, is, in the matter of cost in cities, at least growing dearer and dearer. Mechanism has, indeed, cheapened our food, and given us cheaper and more accommodating houses for our industrial classes, although we must acknowledge a very large per-centage of the homes built are unworthy of the name. Leaving aside for the present the serious question of life and living in view of the future, let us look calmly on the subject of mind and mechanism in what we have in the past looked upon as skilled labour. Manual skilled labour in contradiction to mechanical, is mental labour to a great extent, although the hands are employed in performing it. The sculptor that sets to work with his mallet and chisel on the rough marble from the quarry, and ends his task by leaving it the perfect piece of statuary he intended it should be, exerted a large amount of thought, and the delicate touches given with his hand show the latter acting in unison with his mind. Were failure to result instead of a success, it is possible that the fault might be attributed to manual manipulation instead of to any lack of mental culture. In the execution, however, the mind of the educated artist or workman, through the eye, is the great corrector. As it is with the artist, so it is with the skilled workman who sets out his own piece of work and completes it in all its parts so far as it is connected with his trade. The value of technical education to the workman is never fully illustrated, and never works such a benefit to the worker as when there is scope for its display on an undivided piece of workmanship. It is immaterial what trade we select, but let us take the building-trade as one more in keeping with our channel of thought and observation. A staircase and handrail hand, if he know his business thoroughly, may be said to have some share of technical education. Give him a plan or no plan, save telling him a certain space is provided, or that he will have to provide it himself by alterations, it is required of him to put up a good stair and a handrail to range over it free of constructional defects and undeniable in point of workmanship. If he lay down his own plan it will cost him a good deal of thought; if he work according to another person's plan, it will also cost him some careful thought, particularly if the plan is a new one, and the construction intricate. In such a case as this the workman may, like the artist, get other help to do the rougher portions of his work under his direction, reserving to himself the entire responsibility. No regular division of labour takes place here, and the impress of the workman's mind and the skill of his hands will be found to have worked harmonious and agreeable results. It is not a case of pin-making or modern shoemaking, where one trade is chopped into from six to a dozen of so-called branches, which, no matter how far they cheapen, have certainly the effect of dwarfing the intellect of a large number of workmen.

A carpenter was both a carpenter and joiner once; but now a carpenter,—at least in London and other large cities,—is a roofing and flooring and heavy-framing hand. It would be difficult to tell exactly what a joiner is since wood-working machinery has come into operation. The sub-divisions are many and are extending. Roughly speaking, we have machine hands, who saw, mortise, tennon, rabbet, mould, and perform other operations. Then we have the bench hands, who put doors, sashes, shutters, and other framings together. Next we have the building or outside hands, from the humble "floggers" to the more intelligent "fixers."

Technical education will not make any material alteration in the position of workmen engaged on any one of these divisions of labour; but it will, in the workman who is, or aims to be, a complete joiner, a master of all the branches. In fact, house joinery is only one branch after all, and the old ordinary apprenticeship of seven years afforded ample time for the intelligent youth to acquire the trade. We have reached a strange transition in the building art when the sash or door framer, or fitter, the trimmer or fixer, calls himself a joiner. A joiner is only he who can execute everything with readiness, from the making of a simple four-light sash to the putting up of a respectable staircase or handrail. He should not only know how to make these framings and joinings and put them up, but he should also know how to set them out on a drawing-board.

Take the more limited case of the boot and shoe maker. Formerly, the man who could make a good Hessian, Wellington, Blucher, or hunting boot, could also make a good pair of shoes, whatever might have been the current fashion of the day; and he could also make a lady's boot. Boot and shoe making, since the advent of machinery particularly, is not only divided into men's and women's hands alone, but is subdivided into a dozen sections. There are closers, lasters, clickers, riveters, peggers, finishers, and quite a number of intervening workers of various names, to whom the work is parcelled out, and the workers embrace boys, girls, and men. There is but little room for the display of intellect, or the exercise of technical knowledge on the part of any sectional worker in the craft of shoemaking, and except for the presence of the known and living mind of the workers, we might almost say that the artificers in these instances were the automatons and the machines the master workmen. Our great market supply of boots and shoes, apart from the older form of individual or customer order, might be termed the cast or moulded boot and shoe branch in nearly the same sense as the casting iron and metal branches are termed, so as to distinguish them from wrought-iron work. A designer or pattern-maker is needed in both instances, and he will in the case of metal-work, have room for the display of thought; but the mere moulder, maker, or putter together of sectional work, in either trade, is but a mechanic in part, useful as a unit of the aggregate of divided labour, where it exists, but useless in another country or state of society when thrown upon his own resources to make a living by the pursuit of his calling.

The stucco-plasterers of old, in connexion with the building trade, were, to a certain extent, art-workmen. The ornamentation they executed was wrought by a careful and delicate manipulation of the hands and by a trained and educated eye. The plasterers of to-day are, in general, mere casters and fixers of work they do not design, and, except in a few instances, they are unable to design, from lack of a knowledge of drawing. Our object in this paper is not to disparage the benefits that the introduction and use of machinery has brought us, but to show that we may be led to over-estimate the value of mechanism to the dwarfing of the human mind, and that we may in consequence lay the foundation of a fearful reaction at a future period. Mechanism is the product of the cultivated mind. The steam-engine was not invented or perfected by a race of boors. Wood-working machinery is not the growth of a year, nor the outcome of minds who knew nothing of the trade they were to be engaged in or the materials that were to be operated upon. Practical mechanics have invented and perfected machines belonging to their own trades and other cognate ones, and the result of their labour, though it may have benefited themselves, worked a revolution, for the time being, disastrous or unfavourable to their fellow-workmen. That was foreseen and expected, and sometimes, under very erroneous notions, was rebelled against by workmen who feared to be displaced, and could not readily, through age or other causes, turn their hands or direct their energies to a new calling. We see accomplished facts that must be acknowledged; we observe fresh and growing tendencies in a mechanical direction, and we can almost anticipate the results of many of them. The mind of man is not only active, but feverish; our wants are still many, and the age is impatient. The one great thought, however, which is uppermost in the brain of many capitalists—the thought and the wish of superseding manual labour as far as possible—is not altogether a healthy or wholesome thought. Though we say it is not a healthy thought in view of the possible future, it is nowise a dishonourable one, as thoughts go, in a state of society where every one is supposed to watch his own personal interest. Manual labour will, of course, continue to be superseded by mechanical appliances, and various skilled branches of trade will, by its application, be cut up into fragments complete; master-workmen will die out, and be replaced by men whose skill will be limited to a small sectional area, and quantity of workmanship will, we fear, in many instances, be the output of the individual workman to the loss of quality, and quantity will possibly become a necessity on the part of the workman to maintain the rate of wages that the altered state of his trade renders it more difficult for him to obtain as a sectional worker. Mechanism is a multiplier in respect to quantity, and, by leading to the subdivision of labour, it ought to lead to quality also on the part of the sectional worker; but it is not doing so, for a love for his art can scarcely exist to any large degree in the heart of the workman, who may neither begin nor finish the piece of work that he may be engaged upon.

The cultured mind is the most powerful active and living piece of mechanism in our possession, and it is our duty to utilise it and develop its capacity. Civilisation has come through its exercise, and barbarism is possible through its neglect. We cannot dwarf it in the person of our workman without injuring ourselves and society in the future. Let us lighten the labour of the toiler by all means, but let him have food and exercise for the true scope of his brains and hands. We cannot manufacture thought, like doors or sashes, or boots and shoes; but we can create food for thought, and prepare minds for its digest. As invention is the outcome of the thinking mind, the aim of mechanism should be to elevate. It can never be pronounced successful in its results so long as the two extremes—wealth and pauperism—are begot of its application. The former is its own safe guardian, the latter needs the public as its watcher. The poor can only injure the wealthy by acts of lawlessness, such as incendiarism and revolt. The wealthy can injure the industrious poor by perfectly legal acts, and the law does not hold the rich man amenable for reducing with one blow 100 of his 300 workmen to a state bordering on pauperism. We cannot close our eyes to these contrasts; they have occurred before, they are occurring now, and they will occur on a larger scale in the future. The action of the mind in inventing mechanism has produced a partial evil, and the same mind will have to provide a compensatory action. As the prime object of all good government should be the greatest happiness for the greatest number, it will eventually have to devolve on wise administrations how far good government is rendered impossible in a state of society where every man is allowed to do what he likes with his own, be his property of a mental or mechanical kind, or the outcome of both. No interest should stand alone: where such is made possible, evil is created. Dependence upon each other is the strong bond of society, by which man to man is united for the general welfare.

THE ELEANOR CROSSES.

THE Eleanor Crosses are of so much interest, both historically and artistically, that notices of them constantly crop up; and although the subject has been discussed in our pages before now, a somewhat fuller notice than that given by Mr. A. Hall in our last will not be out of place, more especially as the abstract made by that gentleman is not quite correct in one or two particulars.

In the year 1841, Mr. Beriah Botfield printed in his "Manners and Household Expenses of England in the Thirteenth and Fifteenth Centuries" (Roxburghe Club) the very interesting rolls of payments made by the executors of Queen Eleanor, which contain notices of the sums paid for nine of these crosses. The Rev. Joseph Hunter had previously used these rolls for his very full and valuable paper "On the Death of Eleanor of Castile, Consort of King Edward I., and the Honours paid to her Memory," printed in the *Archæologia* (vol. xxix., p. 169). It is from these two sources that all

trustworthy information on this subject must be obtained. Former antiquaries, not having proper documents to consult, were left somewhat to conjecture, and they differed much among themselves as to the original number of the crosses. Stow gives it as nine, Camden as ten, Stukeley as eleven, and Gough as fifteen; the last writer is the only one who admitted Hardby (for which there is no kind of authority) on the list. The nine crosses mentioned on the rolls are those at Lincoln, erected by Richard of Stow, mason; at Northampton, Stoney Stratford, Woburn, Dunstable, and St. Alban's—all five by John of Battle (de Bello, or de la Bataile); at Waltham, by Roger de Crundale, in conjunction with Dymenge de Legeri, or de Reyns; at West Cheap, or Cheapside, by Michael of Canterbury; and at Charing by Richard de Crundale, and completed after his death by Roger de Crundale. The three crosses not on the rolls are those northern ones at Grantham, Stamford, and Geddington, and they were probably erected after the year 1294, later than which date the accounts do not come down. The authorities for Grantham are tradition and Camden; those for Stamford the same, and in addition a native topographer; the cross at Geddington still remains. The decorated portions of all the crosses appear to have been worked in London and then sent to their respective destinations. The sculpture was by William de Ireland and Alexander le Imaginator, called also in one place Alexander de Abyngton. We thus see that the principal artists employed were Englishmen, for the rolls entirely disprove Walpole's supposition that they were foreigners. Cavalini, to whom Charing Cross was attributed, was not born until 1279, and was therefore about eleven years old when the Queen died. Those crosses that were nearest to London are supposed to have been the richest, as the most money was spent upon them. The one in Cheapside cost three hundred pounds, and was more magnificent than any of those before it. It stood in the middle of the street and was the intermediate resting-place between Waltham and Charing. This appears to be a strange position, and it has been suggested that the body rested in St. Paul's. Charing Cross was the most sumptuous of all, and the architects received 450*l.* for it. Mr. Hunter writes,—"What house there could have been near the site of Charing Cross, is a more difficult question"; but an answer is not far to seek, for the Hospital and Convent of St. Mary Rouncival, founded by William Marshal, Earl of Pembroke, in the reign of Henry III., stood on the site of the present Northumberland House. Of course Mr. A. Hall intends a joke when he refers to the absurd derivation of Charing from *Chère Reine*, which might have been acceptable to the hap-hazard etymology of former times, but could hardly be put forward now as a possible one. Peele seems to refer to it in his "King Edward I.":—

> "Erect a rich and stately carved cross,
> Whereon her statue shall with glory shine,
> And henceforth see you call it Charing Cross;
> For why, the *chariest* and the choicest queen,
> That ever did delight my royal eyes,
> There dwells in darkness."

There are other Charings in England, and the place is referred to in the executors' accounts as Charrynge. These facts, and the unlikelihood of a name equally applicable to all the crosses being attributed to one in particular, make such an etymology impossible. Eleanor, the daughter of Ferdinand III., and half-sister of Alphonso, King of Castile, was in her fifteenth year when she married Prince Edward at Burgos in 1254. The marriage was an unpopular one, as there was at the time a great jealousy of foreigners among the English, owing to Henry III.'s constant advancement of them. The princess, however, gradually obtained the love of the people, and when she died, after a married life of uninterrupted happiness for thirty-six years, she was sincerely regretted by all. Her death took place at Herdeby, or Hardby, a little village in Nottinghamshire, five miles west of Lincoln, on the evening of the 28th of November, 1290. Her body was removed to Lincoln to be embalmed, and the bowels were interred in the cathedral. The dates of the succeeding events are not positively known, but can be guessed by the king's signatures to writs. On December 2nd and 3rd Edward was at Lincoln; on the 5th, at Casterton (on the road from Grantham to Stamford); on the 9th, at Northampton; and on the 13th, at St. Alban's and London, from which it is supposed that the funeral *cortége* started from Lincoln on the 4th, and that the king, who accompanied it as far as St. Alban's, there left it, and proceeded to London through Barnet, in order that he might meet it at its entrance into the city. The body appears to have arrived in London on the 14th, and to have been entombed in Edward the Confessor's Chapel, Westminster Abbey, on the 17th. The head, which had been separated from the body, was deposited in the Church of the Blackfriars in London. Mr. Hunter writes:—"The ordinary route was from Stamford by Walmesford to Huntingdon, and thence by Royston, Puckeridge, and Cheshunt. But it was intended that the august procession should pass through a more frequented part of the country where the queen was well known. It was also part of the plan to take some of the greater religious houses by the way, and to have suitable places at which to rest. Hence the deviation from the direct line from Stoney Stratford to Dunstable in order to include Woburn."

The varied fortunes of the different crosses are very remarkable, three still remain, viz.—Geddington, Northampton, and Waltham, some have decayed away with age, and others have been destroyed. The fate of the one in Cheapside is perhaps the most noteworthy. The original stone cross was found to be in a bad state in the year 1441, and a new one was therefore commenced which was not finished until 1486. This was replaced in 1600 by a third cross which was finally demolished in 1643 by order of the Parliament.

The idea of erecting an architectural cross at every place where the funeral procession stopped for the night is a very beautiful one, and we could have wished it to have arisen spontaneously in the noble King Edward's own heart. But Mr. Hunter seeks for a precedent in the case of St. Louis (Louis IX.) of France, whose body was carried on men's shoulders to be buried at St. Denis, and wherever the bearers rested on the way from Paris crosses were afterwards erected. The respect and love exhibited by the king, however, were not less because the idea may not have been original, and we find him unsatisfied until he had done all that he considered right. He was not content with the erection of crosses in the highest art of his day, but gave money for masses to be said for her soul in perpetuity, and in accordance with his will the anniversary of her death was kept for two centuries with splendour and ceremonial.

THE MAKING OF ARCHITECTS.

It will be readily admitted by all who possess a knowledge of the subject, that the architectural profession is in an unsettled state, or at all events that the art is in a state of transition. There is no lack of energy or enthusiasm on the part of its votaries; there is an evident desire evinced by many to further the developement of the art; but no unity as to the means. A great deal has doubtless been done, and up to a certain point, the desired object has been attained. The point reached appears to us to be a critical one; indeed, to be the turning-point of a new era. We have now attained a certain mastery over every existing style, and to have repeated with correctness the forms used of old, and in some instances to have given them a new expression. But reiteration of even the most graceful expressions becomes tiresome: the ear, the eye, and the mind alike become satiated by continued repetition, and a craving for something new is engendered, so that even an inferior production is prized if it possess the quality of freshness. The work of the architect is a reflex of his mind, but his mind is naturally biased by the requirements of the age, and his intellectual status is shown by the manner in which he meets these requirements. On the other hand, he may be in advance of his age, the leader and former of a new school of art, whose works command the admiration of the public; but such men are rare indeed, the advent of even one such cannot be counted upon.

The Gothic revival originated from outside the profession. The literary productions of the romancers, especially those of Sir Walter Scott, stimulated by the conditions (framed by the representatives of the people) of the competition for the Palace at Westminster turned the tide in a new direction, and it now seems to be ebbing in another.

But this shifting of position will not satisfy the pressure from without; the demand is for something entirely new in style, and if that demand is ever to be responded to the answer must come from within the profession and not from without. Is the response to be a discordant babel or a united voice? How can unity of action be brought about when there is no recognised authority to appeal to? If the public really wish what they call for they must provide the means; and the best and only means we can think of is the formation of an architectural college, where systematic teaching will be provided for the students of the art.

State patronage has been bestowed upon the sister arts of painting and sculpture; and a new school of painting is rapidly developing itself. The decorative arts have also received a stimulus by the formation of schools of art throughout the kingdom. Architecture is surely as deserving of State help; it is an art which concerns every one, from the highest to the lowest; its productions are not stored up in saloons and cabinets, but are open to all as a means of cultivating and improving the taste; the beauty and amenity of our cities and towns depend upon the architect,—his works affect both the physical and the moral welfare of the people.

True it is that much has been achieved without aid from the State, but as a country becomes more populous, and its social relationships more complicated, the greater is the necessity for State interference. Numerous pretenders have arisen, and by dint of sheer impudence and perseverance have succeeded in deluding men into the belief that they are architects, for there are no means of distinguishing the quack from the proficient.

To obtain proficiency in the art is now a most difficult thing. An apprenticeship in the office of a first-class architect does, indeed, provide a means of education to the student, but the teaching is not of a catholic or systematic description: he has to grope his way without a guide, and he picks up what he stumbles against in the narrow path to which he is restricted. Victory cannot be gained if each recruit is allowed to skirmish on his own account; drill and discipline must be enforced by a competent staff of officers, else there will be nothing but a rabble rout. A solitary professor of architecture cannot, in the nature of things, even touch upon the various branches,—historical, æsthetic, technical, and scientific,—which should form the curriculum of an architectural education. A correct taste can only be founded upon a substratum of knowledge; there is a fixed standard of truth, and the taste or appreciation of what is really good can be cultivated to a high degree.

There is no lack of books treating upon architecture, but the same may be said of every other science and art. These books are generally profusely illustrated, and are relied upon by designers as a means to which they can resort for whatever they require. The common course of procedure is after this wise. The young architect, after having fixed upon the style he is to adopt, selects from his collection of prints or sketches what he considers the most beautiful pieces of detail. These he applies, as profusely as circumstances will permit, to the proposed structure, confident that the result will be eminently satisfactory; for how can it be otherwise when he has used not a single item which in itself is not really beautiful? But the result is not what was anticipated; he is in the position of a child who has satiated itself with sweets. By experience he learns that the acid and the bitter give a peculiar relish to his diet, and are quite wholesome. His conglomeration of prettiness he finds to be a mistake; he finds out the value of mass and breadth of surface, and in course of time his works may possess a special individuality, and exhibit that power inherent to the true artist, whether he be poet, painter, sculptor, or architect.

This is good so far as the individual architect is concerned, but it does nothing towards the formation of a national school of architecture, a result which can only be brought about by united action, proceeding upon recognised principles, and by such united action only may it be possible to expedite the growth of a new style.

Signet.

Institution of Surveyors. — The next meeting will be held on Monday evening, February 16th, when a paper will be read by Mr. Ralph William Clutton, entitled "The Self-sown Oak Woods of Sussex." The council are seeking to form a geological collection, illustrative of the rocks and soils of various districts in which they reside.

SUBSTITUTES FOR COAL.

PREVALENT high prices have brought out various suggestions of more or less merit for economising the prime article of fuel, and there has been some serious talk of a Stock Company for the manufacture of a patent article compounded of earth and fine coal. As many of these suggestions have been criticised as novelties, and are being experimented upon as such, it will probably surprise some of our readers when we state that precisely similar compositions were actually in use for domestic purposes, and suggested for manufacturing use, nearly 250 years ago.

Our two first extracts are taken from pamphlets published in or about the year 1644. The first bears the heading, "Good News for the Poor; or, An Expedient humbly offered for supplying the Want and bringing down the Price of Coales;" and proceeds thus:—

"'Tis certain, necessity is most times the parent of ingenuity. To pay 40s. or 50s. for a chaldron of coale went deep into a poor tradesman's pocket,—especially those that were forced to use great quantities. Whereupon some plodding industrious heads that had seen fires of turfe or peat in the country, or been in Holland, where (as one saith pleasantly) they fetch fire out of water, burning a kind of mud taken out of their ditches, and dried, began to think of mixing clay with their coales, which they found to succeed so well that several eminent victuallers and coffee-houses (particularly near the Royal Exchange) made it their common fuel, to their advantage. The manner of doing it is this:—Take two loads, that is to say, a chaldron of coales, and cause them to be sifted in a wide hole sieve, that so all the dust and small coales may go through, and the great round coales remain behind. Then take a load of clay (for siftings of a chaldron of coales are generally enough for so much), and cause it to be mixed well together with the said dust or small coales; for which purpose, if your clay be not moist enough to work up well, you may wet it a little, then make them up, either in round balls or like bricks, but let them be not above half so big every way; and then letting them lie some time to dry well, they will be fit for use: for having laid a small thin bottom of coales, you must then lay on these pieces, intermixing now and then one of your great round coales: it shall continue fresh and in good order, with very little trouble, a whole day, and is not offensive in smoak, smell, or otherwise. Nor let any think this to be a trouble of too much trouble or charge; for first you may have a load of clay brought home to any place in London for 4s. 6d., and any common labouring man will sift your coales, and make up in balls as aforesaid, in three days at furthest, which, at 1s. 6d. per day, is 4s. 6d.; so that the whole charge will amount to 9s., and this being done, it shall do you more servise, burn better, and last longer, than any three chaldrons of coales you can buy. You may easily work them in a cellar or shed, and when they are made up they will lie conveniently in small room, provided it be but dry."

Our second extract is of more pretension, and its author evidently looked beyond the domestic to the manufacturing interests of his country.

"*Artificial Fire or Coale for Rich and Poore.*—This being the offer of an excellent new invention by Mr. Richard Gosling, engineer (late deceased), but now thought fit to be put in practice,—Read—Practice—Judge. First provide a piece of ground where the sun lies upon it, and for the better ordering take a brickmaker or a labourer to doe it. Doe it thus:—Take three loads of red morter, such as you make your bricks with, double loads, half a chaldron of good sea coales of the smallest and best, three sacks full of the best small coale, four bushels of sawdust, four trusses of straw chopped; work all these together with water stiff as bricks; then when it is worked altogether very well, take four sacks of dust of small coal, and with that used as they do the sand for casting of bricks; then cast the engrediants as you cast bricks, but half so thick, and dry it as brick is dryed, or you may make it up in round balls not too big, with charcoale or small coale dust on the outside, and so laid to dry; when they be thorow dry, burn them with a little Scotch coale or wood, or any combustible matter to fire it, or with two or three wooden chips to kindle your fire withall, and to keepe in the life of the fire, and these cast a most excellent heat, and keepe fire for any use, to rost, boile, or bake for the richer sort, but be sure to lay them not too close."

Then follows a formula "for the poorer sort," of which we shall simply remark that it includes in its composition the sweepings of cow-sheds, stables, and the offal of slaughter-houses!

We also learn it was "said" that "Greenwich Heath, or Hounslow Heath, turf, well dryed, is very good fewell, with a little Scotch coale burnt with it."

It is also stated by an author writing late in the eighteenth century, that "balls of small coal mixed with clay are very much used all over South Wales, particularly in the counties of Pembroke and Carmarthen. They are formed about the bigness of a man's fist; great in the middle and verging smaller toward the ends. They are generally made up and put upon the fire quite wet, in the form of a pyramid, and when thoroughly lighted, make a most brilliant appearance. One of these fires, if made up with skill, will last ten to twelve hours. Those who live near the sea, instead of clay, use mud taken from under flood-mark at low water, which, from the quantity of salt it contains, makes the ashes a valuable article in agriculture for the husbandman, and in horticulture to the cottager. . . . . The balls, mixed with mud, emit no disagreeable smell in burning."

The same author says, that "kindling balls might be used with great advantage for lighting fires, particularly in London, where the expense of billet-wood, which is used for the purpose, is very great." Their composition is thus stated: "Equal parts of coal, charcoal, and clay; the two former reduced to fine powder, well mixed and kneaded together with clay, moistened with water and then formed into balls of the size of hens' eggs, and thoroughly dryed. They may be made so inflameable as to take fire in an instant and with the smallest spark, by dipping them in a strong solution of nitre, and then drying them again."

It is remarkable that all three of the compositions intended for fuel are said to have the most essential qualities—brilliancy, heat, endurance, and freedom from objectionable odour; qualities which are sadly wanted in many sorts of cheap coal.

WOOD-WORKING MACHINERY.

SIR,—Having had more than twenty years' experience on wood-cutting machinery as operator, manager, and builder, I will endeavour to answer "B. J. A.'s" questions in your issue of the 31st of January.

Why, he asks, does not wood-cutting machinery pay as well in England as in America? and why do they fail to make it a success here? I have found that why they have failed in their wood-machinery here is solely the fault of the masters not knowing what machinery is best suited for their work. Seeing a piece of work that has been done, they buy the machine, and find out, when it is too late, that it is not the machine that they want at all, or that some other building firm makes a machine far superior to the one they have. Therefore, I contend, it is from the want of knowledge that they do not succeed with their machinery. Why, sir, I could name cabinet firms in London that have machinery, and some of them are executing their work 15 per cent. cheaper than others. You may say, "How is that?" There is only one answer, and that is, from better management. Give the machines the work they should have, and give it to them properly, and then there will be no such thing as failure. I know of a master cabinet-maker that has recently put in a machine that takes up at least 8 ft. of room, and room that he could hardly spare, when if he had asked a practical man he could have been told how to put up a machine that would have done his work, and not taken up above 18 inches square of room, nor cost half the money, and been entirely out of the way: of course, I can only say it is from the want of knowledge of machinery. Put in the right machinery, and give them the wood; then we can make machinery pay as well in England as in America: put in your shop the right machinery and have it properly managed, and then we will have no more Belgium doors and sashes. We had a specimen of them a short time ago in building one of our new hospitals: they could not use half of them, and I am surprised to think that some enterprising capitalist does not take it in hand, for I am positive we could make as cheap as we could import.

Now one word to "B. J. A." on machinery in general. You say that England leads the world in wood-cutting machinery, which was proved a the Vienna Exhibition; but, sir, you do not say whether they are copies of Richards, Thorne, & Co.'s, of Philadelphia. Now let us give our American cousins what praise is due to them, for I have seen some as good machines in America as I have here; and I have a piece of work with me now that was done on an American machine, and I have not seen or heard of a machine like it in England, and it is a machine that every master cabinet-maker ought to have. Machinery will pay as well here as in America if it is properly managed; but buy the right kind for your work, not of A, or B, or C, but of A, B, and C, and then you can get the machine that is best adapted to your work.

W. C. H.

FROM POMPEII.

PROFESSOR CHURCH, of Cirencester, writing from Naples, says:—

The condition of the streets, temples, and houses at Pompeii is far more perfect than I had expected to find it. The climate is far more favourable to the preservation of such remains than that of England. The rich colours of arabesques and pictures remain upon the walls, and one can see through the windows of the houses the very views of Vesuvius and of the Bay which the Pompeiians saw, and for which it is evident the arrangement of the windows was originally planned. One great point of difference between the works of the Romans here and in Britain strikes one at every turn. If we compare the walls and pavements of Pompeii with those of Corinium and Chedworth, we perceive how skilfully the Romans in England changed their modes of building and decoration to adapt them to the altered condition and different materials of the new country. The substitution of baked clay and of colitic and liassic stones for the rich and abundant marbles of Italy, is one point which may be noted in this connexion.

The museum of Naples contains the best treasures of fine art and all the more interesting objects of domestic life and of civilisation which the excavations have yielded. Here are marbles and bronzes, loaves of bread, with olives, walnuts and figs, jewels and vases of gold and silver, papyrus rolls, 4,000 specimens of ancient glass, and I know not how many thousands of painted earthen vases. The inscriptions, the mosaics, the wall paintings, and the sgraffiti (or wall scribblings) are of the deepest interest. Two matters here suggest themselves for remark in connexion with the remains of Roman art at Cirencester. In the Corinium Museum is a fragmentary head carved in stone, one of the eyes of which has traces of the black enamel which represented the pupil. This mode of treating the eye is quite common amongst the works both of bronze and of marble found here. Another point is this: my observations on hundreds of wall-scratchings at Pompeii and elsewhere in this neighbourhood have confirmed my conviction of the genuine Roman origin of the example of squared words which was found at Cirencester: I now feel it impossible to doubt its authenticity.

HOUSE-TOP GARDENS.

FOR some time past, an idea has obtained that the garret story, now the least attractive, might, without much extra expense, be made the pleasantest in the house. It was suggested in the *Builder* years ago. The roof itself should be as easy of approach as any other floor in the house, and, with a flat properly-constructed roof, surrounded by an ornamental railing, the house-top would, in fine weather, prove an agreeable airing place for the household. A step further, and we have the house-top garden, or the house-top conservatory. There can be no doubt that the proper carrying out of this idea, in a variety of ways, would prove one of the most agreeable innovations ever made in gardening. To Mr. Lascelles, the horticultural builder, of Bunhill-row, Finsbury, says the *Garden*, belongs the credit of showing what may be done in this way, even in the heart of London. The roof conservatory forms the roof-story of Mr. Lascelles's offices; the floor of the conservatory, which is on a level with the bottom of the cornice shown in an illustration given by our authority, forms also the roof of the story beneath, is formed of concrete, with iron imbedded in it, to secure all the needed strength. Brick beds have been

formed round the sides of the house, and these contain earth for vines, which cover the roof. The surface of these beds forms a convenient standing-place for plants in pots. The house is of wood, bent by the aid of steam, and well, but not expensively, constructed, and the effect from the street is described as being very good. The glass is not bent, although it is so in appearance. With dense shade overhead, a house of this kind would form a fernery, and, without such shade, fruits that endure a dry atmosphere might be grown after the orchard-house fashion. Abundance of water would, of course, be required in any case, but this would not lead to much inconvenience, as the ordinary supply to the house could be made available by the cistern being placed on the conservatory floor. The roofs of large public buildings, such as theatres, would afford capital sites for winter gardens on a large scale; water in abundance is required on such roofs, and that is the chief requirement of the plants. In such cases, the winter-garden would form a new and attractive feature of the establishment. As regards business houses, a modification of the same plan might be desirable, where very good light was required in the upper story. Such a pleasant innovation in the City naturally suggests many ways in which a like kind of glasshouse might be made to add to the comfort and elegance of private houses of every class, from those who could afford a well-furnished winter-garden to those who could only use the upper story as a playground for children. The architectural difficulties are surmountable. The ordinary square type of glasshouse would, of course, be unendurable over any handsome house. Suppose a builder is about to erect a row of a dozen or so of good large houses, each of these might be furnished with its conservatory on the roof, communicating with the conservatories of the houses on both sides, so that the whole would form one continuous greenhouse, uniform in height and architecture, and so presenting a much more pleasing appearance, when viewed from the road or street, than if the conservatory of each house was detached and built in a different style. This would form a very fine winter-garden, common to all the inhabitants of the row or block of houses, much in the same way, as is at present the case with many London gardens.

THE INFLUENCE OF EASTERN ART ON EUROPEAN MANUFACTURES.

AT the conclusion of the paper on this subject, read by Dr. Dresser at the Society of Arts, part of which we printed in our last,—

Mr. Christian Mast, remarking on the observations of Dr. Dresser as to the origin of Oriental art, thought that religion was really at the bottom of all high art, and that was the cause of different kinds of art being represented in different countries. Mosaic art clearly had reference to the Mosaic religion. They could not have produced a style of art like the Greeks, who were taught to honour men, and which resulted in their producing the most beautiful forms of a beautiful idea, as exemplified in their fine statues, which were the most perfect creations of beauty the world had seen. The same observation would apply to Christian art, as seen in the Gothic architecture, in which our cathedrals were constructed. His opinion was that the perfect art of the Greeks, and the art of the Moors, and the Gothic art could never be surpassed. They were perfection. He agreed with Dr. Dresser, that our object must be to learn from the East, and to endeavour to reproduce from our own midst a new art, and not to imitate. The whole nation must work at it; and if the religions of the nations of old led them to progress in art, so it would be amongst ourselves, for religion was the primary cause of a higher degree being attained in art.

Dr. Heinemann, having been to Vienna, and paid special attention to the works of art, could bear testimony to the correctness of the observations of Dr. Dresser. Not only England, but Germany, was also persuaded that there was very much to be learnt from Eastern art. In almost all the books of art, especially in those giving a history of painting, it was stated that the infant standing in the vesica-shape, was of Christian origin. He thought it was not of Christian origin, but could be traced to other sources. Even the cross, the symbol of the Christian religion, had nothing to do with Christianity, so far as its origin was concerned.

Mr. Pearsall ventured to suggest that the lecturer should on another occasion give an account of the works of English manufacture and art which were introduced into the East, of those which were successful and those which were rejected, for there were always two sides to a question. We had sent art productions to the East, and it would be very satisfactory to English capitalists to know what works go to Eastern countries, why they go, and why they were esteemed. In Eastern countries, where the Mahommedan religion prevailed, the precepts of the Koran were carried into ordinary life, and the people were not permitted to make a representation of any living thing; and therefore everything was distorted or converted, or conventionally represented, and was not a liberal representation at all. They were not allowed to give a direct representation of nature, save those of royalty, the sun, and so forth; and even certain colours were tabooed. English ladies in Constantinople had been laughed at and been subject to annoyance for opening a green umbrella, green being a sacred colour. It was necessary, therefore, for the English manufacturer to have some knowledge of what would be acceptable; for what was the use of attempting to design a thing for the East, which, though it might be beautiful to our eyes, would be of no use. In illustration of the lack of English art which was suited to Eastern tastes, he instanced the difficulty which had been experienced by the English Government in the selection of suitable presents which it was desirous of making to certain Eastern persons at the close of the Crimean war, owing to the great difficulty of obtaining suitable designs. Eastern people had prejudices which must be consulted, and it was necessary to avoid hurting them.

The Chairman (the Rev. Dr. Lee) said it became his duty, as it certainly was his pleasure, to convey the thanks of the meeting to Dr. Dresser, for his most interesting, able, learned, conclusive, and argumentative paper. One point seemed to have been brought out with great clearness, both by the lecturer and by those who had spoken, the intimate connexion of religion with art, not only with ecclesiastical architecture, but with things of domestic manufacture. The greatest poems ever written were religious poems. The most important buildings were erected for purposes of religion, whether in Egypt, or in Persia, in India, or in our own country. And he was quite sure that the style of architecture which was most agreeable, most remarkable, and he might say the most telling, was what he might reasonably call the Christian style—the Gothic. This had been revived in the present day, and he saw no chance whatever of our arriving at any kind of composite style. Of all the styles of architecture, we were returning to that which was peculiarly English, essentially Christian, and inherently beautiful. He would defy any one to point out any building in London, notwithstanding its deficiencies, which so attracted the foreigner as the Houses of Parliament. It was a delight to look upon, though he was perfectly certain we should have even a finer specimen of that kind of architecture in the new Law Courts.

Dr. Dresser, in replying, said he had expected to receive a severe criticism on his paper, but was agreeably mistaken. He did not think Mr. Ford had quite comprehended his remarks as to the ugliness of certain bridges; but he still maintained that many engineering structures were insufferably ugly. Engineers had no taste as a rule, and the manifestation of an ignorance in this respect our engineers were continually thrusting upon us, till it was absolutely painful. But he did not see how it was possible for them to become acquainted with the laws of beauty and utility, for it seemed to him that a lifetime was almost necessary to learn his part—the laws of beauty. As to the remark that we had done much for the East, by sending our manufactures out there, he would ask, what had we done for India compared with what they had done for us? We derived a vast number of most valuable hints from the East. But what had we done for them? We had established schools of art in Calcutta, Bombay, and certain other places, and what was the result? In the Exhibition of 1862 were to be seen carpets manufactured in India by those who had been taught in our art schools, which, being exhibited by the side of native manufactures, were an utter national disgrace to us. We had done a vast deal to vitiate their taste, but he denied that we had done one single thing to raise them in a knowledge of decorative art. Instead of spending money in establishing such schools, he would rather spend money in studying under those native artists, who, he contended, were the greatest ornamentists in the world. From a utilitarian point of view, he certainly admitted we were, as manufacturers, the first in the world. He would observe that in Persia they frequently used figures and represented living objects, such as the human figure, beasts, and so on; and, although the Koran did not allow it, it was continually done. As to the remarks of the chairman, he would say that Christian art was essentially heathen. He was prepared to demonstrate that the nimbus came from fire-worship, and he could trace it all through from its origin. He was prepared to show that the vesica shape had its origin in heathen religion, that the winged cherub also was of heathen origin, and that the cross was a symbol in Egypt. Indeed, he would even go so far to say that every Christian symbol was of Pagan origin, and that Christianity, as it united Classic and Gothic architecture, adopted all those forms which it found already prepared, and which were suitable as peculiarly striking expressions of the new faith. And he was also prepared to show that it adopted all those implements which were peculiarly striking as symbols. It was a subject which had for twenty-five years occupied his attention, and he felt himself prepared to prove it, and that the very best flat ornaments of the world have resulted from fire-worship.

GAS WORKS, PORTSLADE, SUSSEX.

INSTITUTION OF CIVIL ENGINEERS.

ON February 3rd the Paper read was a "Description of the Brighton and Hove General Gas Company's Works, Portslade, Sussex," by Mr. John Birch Paddon.

The site of these works was the widest, most level, and highest part of a tract of shingle lying between the sea and the canal forming the eastern entrance to Shoreham Harbour. Excellent material for concrete was found in the excavations, and the foundations of the walls were extended so as to make the proportion of the weight of the superstructure to the bearing surface 15 cwt. per square foot. The concrete bed under the retort benches was 7 ft. 6 in. thick.

The retort-house was 284 ft. 6 in. long and 80 ft. wide, inside measurement. The chimneys were constructed with the lower parts of brick and the upper parts of wrought iron, and were sufficiently light to be placed on the benches, so that no floor space was occupied. They were 71 ft. 6 in. high, 3 ft. square at the bottom, and 3 ft. in diameter at the top, the least sectional area giving 1 square inch for each lineal foot of retort, a proportion which had been satisfactory. In consequence of the exposure of the roof to storms of great violence, and to rapid corrosion from the proximity of the sea, it was considered desirable that it should be of great strength, and that its parts should be few and accessible. Accordingly, the roof was designed to sustain a weight equal to 60 lb. per square foot of external surface, or 72 lb. per square foot of plan covered. With that weight no piece of metal was subjected to a tensile strain exceeding 5 tons per square inch of section, and the strains on the parts in compression varied from 2 tons to 4 tons per square inch of section. The roof consisted of ten Warren trusses of 84 ft. span and 14 ft. deep, placed about 30 ft. apart. Across the top beams were laid four lines of latticed purlins, and upon these purlins rested the bars carrying the skin of the upper portion of the roof. The lower portion of the roof was formed with the framed struts of trusses, and some lighter intermediate framed struts were joined to the bars immediately over them. Thrust on the walls was prevented by a series of ties, with screwed couplings, placed between the feet of the intermediate rafters and principal trusses. The laths were of channel-shaped section, and Duchess slates were fastened thereto with screwed clips, two to each slate. Four wrought-iron rudimentary shafts, 10 ft. in diameter, enclosing the tops of the chimneys, allowed the smoke to escape; there was also a protected opening, 5½ feet wide, along the ridge for its entire length, for the same purpose. The roof was constructed by Messrs. Newton & Chambers, of the Thorncliffe Iron Works, and its cost, ready for slating, was 8l. 16s. per square of 100 ft. There were twenty-four benches of these retorts. Each bench had eight long retorts, and there being two mouth-pieces to a retort, made three hundred and eighty-four mouth-pieces in all.

The engine-house contained four exhausters, each exhauster being driven directly by an independent engine. Two of these exhausters were for the purpose of removing the gas from the hydraulic mains and driving it through the scrubbers and purifiers. A self-acting by-pass was carried from the inlet of the exhausters to the inlet of the purifiers, and each exhauster was connected with a governor, which also acted as a by-pass. Only one of these exhausters was in use at a time, the other being in reserve.

The scrubbers used at these works were the first of the kind erected. They consisted of a series of perforated discs or screens, which revolved slowly, in a tank half filled with liquor, so that the gas might pass through the portions of the screens above water.

The collective internal capacity of the purifiers amounted to 22,600 cubic feet. The station meter, one of the largest yet made, was erected, by Messrs. Parkinson & Son, to pass 100,000 cubic feet of gas per hour, and was placed next to the engine-house. The gas-holders were all at Hove, and their tanks were about 34 ft. above the level of the works at Portslade.

The entire cost of the works was about 72,000*l.*; and when the proposed second retort-house and coal-store were erected upon the site allotted for them, the total expenditure would amount to 100,000*l.* The works would then be capable of producing 600 million cubic feet of gas per annum at a cost of 166*l.* per million on the capital so expended.

TROWBRIDGE DRAINAGE AND SEWAGE WORKS.

THE works for the drainage of Trowbridge, commencement of which was reported in the *Builder* in the beginning of last year, are now rapidly approaching completion.

The Local Board have lately been discussing the best method of dealing with the sewage of the town, and on recommendation of a committee appointed to visit the sewage work, at Warwick, Leeds, and other towns, have resolved to adopt the principle of precipitation, and at the last monthly meeting instructed their engineers, Messrs. Gotto & Beesley, and Mr. A. W. Estridge, to prepare the necessary plans and estimates for a precipitation and filtration scheme.

IMPURITY OF THE LAMBETH COMPANY'S WATER SUPPLY.

DR. FRANKLAND, in his last report just issued, as to the water supplied to the metropolis during the past month by the several metropolitan companies, states that the water supplied by the Southwark and Lambeth Companies is inferior in quality to that supplied to any other part of the metropolis. In his report, he describes the amount of organic impurity, during the last month's supply, in a given volume of the Kent Company's water as unity, and states that the proportional amount in an equal volume of water supplied by the New River Company was 1·1; by the East London, 1·5; West Middlesex, 2·3; Grand Junction, 2·6; Chelsea and Southwark, 3·0; and Lambeth, 3·8. He further states in his report that the water of the Lambeth Company had deteriorated, whilst the river water of all the other companies had improved.

THE WORD "WYK."

IN reply to the first query of "Civis" in the *Builder* of 10th January, about the signification of the word "Wyk," I can tell him that it is in Holland a very well-known name for quarters or neighbourhood, into which cities are divided, either for municipal government or for the administration of the poor. The ij in wijk, formerly written wyk, is not pronounced as in Wych-street, but as the sound in NINE, WISE, &c.

Via de Ald Wyk must have had once the signification of the "way of the old quarter," but *wyk* means not "vicus," a way.

I cannot say why a Dutch name is given to a way or village. Was it a Dutch colony of workmen? or may it be taken as belonging to the large number of Dutch and English names and words which are in both languages alike, or almost alike, especially in the old *Fries* language, which is still universally spoken in Friesland, one of the provinces of Netherland.

Amsterdam? D. J. VAN DEN BRINK.

NEW CHURCH TO THE SACRED HEART, PARIS.

THE Cardinal-Archbishop of Paris has invited competition for plans of a new church, to be dedicated to the Sacred Heart. The competition is open to all French and foreign architects, and plans must be sent in before the 30th of June. The structure is to include a crypt, the church proper, several sacristies, and a residence for the sacristan. The plans must be detailed, and accompanied by an estimate according to Paris prices. The total cost is not to exceed seven millions of francs. The plans will be exhibited during twenty days, and submitted to a jury consisting of twelve members appointed by the archbishop and six members selected by the competitors. Three premiums will be given,—the first to be 12,000 francs, the second 8,000 francs, the third 5,000 francs; seven sums of 1,500 francs will be given as a compensation to unsuccessful competitors. The archbishop is not bound in his choice to the plans submitted, but reserves to himself entire liberty of action. Full particulars for the guidance of architects may be had in the hôtel of the archbishop at Paris, from the 1st of February.

THE DESOLATION OF THE COLOSSEUM.

SOME remarks by Mr. C. F. Fuller appeared in the last week's *Builder* under this head. Allow me to suggest what I think would be a better appropriation of this building than those put forward. The freehold belonging to the Government, I have no doubt but that the present lessees would be glad, for a small sum, to part with the remainder of their interest in so unprofitable a property; and then, with very little adaptation, that portion of the collection of the British Museum which has for years been hidden away, might be removed there, to the great advantage of the public. I believe that almost every one would be sorry to see this building pulled down, which is one of the landmarks of London, and, if it were so appropriated, it would be of easy access from any part of London, and an ornament to the Regent's Park retained for a very useful purpose. R. L. ROUMIEU.

HANOVER CHAPEL, REGENT-STREET.

IN reference to the remarks made at the Institute last week as to the late cleansing of the stonework, it appears to have been forgotten that the front was payed over with boiled oil, which I recollect perfectly, being done soon after its completion, and the sombre brown effect it produced until it became begrimed with dirt and soot; but no doubt this had the effect of preventing the absorption of the moisture, and the skin thus formed will account for its not being affected by "Ransome's solution." C. EALES.

WEIGHT OF MATERIALS.

SIR,—I am wishful to know what the weight is of a cubic yard of blue lias lime, also of screened ashes. The latter will, no doubt, vary very much, especially where they have been burnt again, and have become red.

Would any of the readers of the *Builder* kindly enlighten me? G. E. W.

DISHONEST BUILDERS' FOREMEN.

AT the last Middlesex sessions, Charles Canham, one of the foremen carpenters in the employ of Messrs. Cubitt, builders, was convicted of a very serious robbery, and his sentence was postponed with the hope of his giving some information of the valuable property stolen.

The facts of the case are, the prisoner was left in charge of a job in Brooke-street, Park-lane, a nobleman's house, and the family being away, the prisoner had the care of the pictures and furniture on the premises. Messrs. Cubitt had the highest confidence in the man, and he repaid it by robbing the house of several pictures and other property valued at over 200*l.*, which were found pledged and otherwise got rid of. A portion has been recovered, but the remainder is missing.

Messrs. Cubitt were in hopes that Canham would state where the missing property was to be found, and the Judge did his best to assist the firm, who were placed in an unpleasant position by sending a thorough rogue to an employer's house; and Mr. Serjeant Cox told the prisoner it would depend materially on the information he gave to recover the valuable property, as to the term of sentence he would get.

On Monday last, on being brought up for judgment, the policeman in charge of the case said it was understood that the prisoner would write to the prosecutors, and make what amends he could, but he had remained silent.

The Judge said the case was a very serious one, and he wished the law allowed him to send the prisoner to penal servitude. The utmost he could do was to sentence him to two years' hard labour, in the House of Correction.

Another serious case, in which a plumber has been convicted of robbing his employers, was heard at the Surrey Sessions last week.

ATTRACTION.

SIR,—One of your correspondents would render me a signal service, by indicating the mode of solution in such a problem as the following:—What length of time would a body occupy in falling to the earth from the distance of the moon under the influence of terrestrial attraction alone? I can calculate separately the time, supposing the continually gravitative force to be constant, and can reckon the increased power of that force at each diminished distance from the earth; but cannot combine the two results, so as to feel a certainty of accuracy. I should prefer an explanation by a simpler process, rather than the integral and differential calculi if possible.

CARLO F. JOHNSON.

STEAM TRANSIT ON CANALS.

SIR,—In the *Builder*, p. 109, I read a short description of a (so called) *new* method of steam transit on canals, &c.

In the autumn of 1869 I saw the plan you mention in operation in the neighbourhood of Brussels, on driving from that city to the Palace of Lacken. A drag-boat or tug had a following of several barges, and the endless chain was taken up and laid down just as you describe.

The objection to the system that occurred to me at the time was the bow of the tug being so much submerged by the weight of the chain (which traversed the deck from stem to stern) as to evidence great waste of power. This might possibly be overcome to some extent by passing the chain through a compartment at the bottom of the boat, and not lifting it clear of the water.

The canal on which I saw it at work had sloping banks, and there was little *wash*, but the rate of progress was very slow.

Colliery tramways have been worked by means of endless chains in this neighbourhood (Birmingham) for years. E. BETTRIDGE.

*** A similar arrangement is used on the Seine, Paris.

CHURCH-BUILDING NEWS.

Kirby-le-Soken (*Essex*).—The re-opening of St. Michael's Church by the Lord Bishop of Rochester took place on Friday last, when there was a large gathering of the local clergy and gentry. Some forty years ago the church was "restored" in the worst fashion of the day. The original roofs and nave arcades were taken down, and a low-pitched slated roof with flat ceiling took the place of the early ones. The removal of the nave arcades greatly weakened the tower at the west end, and in the present restoration their rebuilding on the original foundations was the first work to be done. The nave and north and south aisles are covered with open-timbered roofs, and the entire area of the church has been benched in pitch pine. A stone pulpit and oak reading-desk have also been provided. The north wall of the church has had a moulded stone parapet added, and the south wall has been refaced with rubble. The tower has been strengthened at the base, and the staircase turret and battlements are partly rebuilt. A new north porch replaces the old one, and an organ-chamber is built on the site of the modern vestry. The entire cost of the restoration (2,000*l.*) was generously contributed by Mr. Richard Blanshard, whose absence at the opening ceremony was greatly regretted. The architect for the restoration was Mr. Henry Stour, of London; and Mr. Joseph Grimes, of Colchester, was the builder.

Exwick (*Exeter*).—Exwick Chapel has been reopened. This chapel was built in 1842, under the auspices of Bishop Medley, then Vicar of St. Thomas. When Exwick was constituted a parish it was found necessary to enlarge the chapel, and the same architect who built the edifice (Mr. John Hayward, of the Cathedral-yard) was consulted by Mr. W. Gibbs, of Tyntesfield, and the work was carried out under his supervision. The additions consist principally of a north aisle, chancel, vestry, and organ-loft, the church being thus considerably extended to the north and east. The new aisle is divided from the nave by an arcading of three bays. These are supported by clustered columns of polished Devonshire marble, and are surmounted by carved capitals, the type of foliage used for the decorations being semi-natural. The line of the sanctuary is defined by polished marble columns, surmounted by carved capitals running up to and adding support to the roof. The chancel and other avenues are laid with encaustic tiles, from Messrs. Morris & Co.'s, of Broseley. The stone-dressings are all of Bath, the window labels and the roof corbels being stopped by carved heads. The stone-carving is by Mr.

Harry Hems, of Exeter. The new seating is all open, and of oak. The seating in the chancel and the other wood-carving were executed by Mr. Sendell, carver, Southernhay, the devices in connexion with the heads of the seats being passion-flowers, vine, oak, ivy, and hawthorn leaves. The reredos and altar have been refixed, and a new altar-rail supplied, from the design of the architect, by Messrs. Richards & Co., of Coventry. A new warming apparatus has been fitted up by Messrs. Garton & King. The contract has been carried out by Messrs. Moass & Son, of Exeter, under the personal superintendence of the architect. The whole of the expense will be defrayed by Mr. Gibbs, and he would have built a tower to the church had it not been for a difficulty respecting adjoining property. Mr. Gibbs has provided an endowment of 200*l.* a year, and built a parsonage-house.

Wokingham.—St. Paul's Church, Wokingham, has been re-opened. This church, which was erected by the liberality of Mr. John Walter, M.P., has been considerably enlarged by the addition of a north and south aisle. The south aisle was opened on Whit Sunday, 1873, and the north aisle has now been opened. Mr. Woodyer, of Grafham, near Guildford, is the architect; and the work has been carried out by Mr. Walter's own workmen, under the direction of Mr. Deacon, clerk of the works. The increase of accommodation has been considerable, 240 additional sittings having been provided. The church will now seat 640 persons. The nave roof has been enriched and strengthened by tracery in spandrels in the principal trusses, and the substitution of intermediate trusses, purlines, and ceiling down to the original purlines in the old roof, which makes the nave roof 41 ft. 6 in. in height, and the wagon-shaped roof being substituted for the pointed has improved the acoustics. By far the major portion of the cost has been borne by Mr. Walter, and the parishioners have contributed 500*l.*

SCHOOL-BUILDING NEWS.

Stockport.—The Primitive Methodist Schools, situate in King-street West, have been completed. The schools were built from designs prepared by Mr. T. H. Allen, of Stockport, architect, and have been carried out by Mr. Henry Derbyshire, mason and contractor. The brickwork was executed by Mr. Henry Barlow, builder; the joiners' and carpenters' work by Mr. John Davies; the slating by Mr. Charles Clarkson; the plastering and painting by Mr. John Stokes; the plumbing and glazing by Mrs. Thompson; and the ironwork by Mr. John Worrall. The contractor and sub-contractors gave a supper at the Canning Inn, to their workmen and friends, on the completion of the work.

Wheelock.—New day and Sunday schools have been opened at Wheelock. The schools, which are for infants and girls, are in connexion with the Wesleyan Chapel, now in course of erection, but they are not to be devoted exclusively to the teaching of children whose parents belong to the Methodist body. The entire cost of the chapel and schools will be 2,300*l.*, towards which about 1,500*l.* have already been received or promised. The schools are situated underneath the chapel, and are lofty and well ventilated, also fitted with Grindell's patent warming apparatus. Mr. J. B. Ford, of Burslem, is architect, and Mr. William Martin, of Haslington, is the contractor for the erection of the building.

Mursley.—The recently-erected National Schools here have been opened by the Bishop of Oxford. These schools have been erected, in accordance with the requirements of the Education Department, under the provisions of the Act of 1870, by voluntary rate, to accommodate eighty-four children, upon a site given by Mr. E. J. Athawes, at a cost, including boundary walls, bell, architect's commission, &c., of something under 600*l.*, from a design of Mr. E. Swinfen Harris, of London and Stony Stratford, architect; the builder being Mr. Matthews, of Winslow. The building is of red brick and tile, with layers and rows of black bricks and tiles at intervals, of modern design. The roof is open polished deal, the walls painted and skirted to a depth of 3 ft. The school-room is 35 ft. by 16 ft., with boarded floor, and contains a grate, hooded with stone. A class-room, 11 ft. by 12 ft., is similarly furnished, and, in addition to offices, a residence for master and mistress is attached. There is a large garden to the residence, and playground for the scholars, the whole occupying about half an acre in area.

Chelsea.—The new schools for the parish of Holy Trintity, Upper Chelsea, which were formally opened by Earl Cadogan, on the 27th ult., are situated in Draycott-street, with additional frontages towards Pavilion-road, and Draycott-place. Accommodation for 400 boys is provided, in accordance with the regulations of the Committee of Council, in two school-rooms, 75 ft. by 20 ft., and 58 ft. by 20 ft.; and two class-rooms, 19 ft. by 15 ft., and 17 ft. by 15 ft. The principal entrances are in Draycott-street and Draycott-place, each with class-room adjoining, while lavatories and the usual conveniences are provided at the back, the playground being in front. The style is Gothic, pretty freely treated in stock brick, relieved by a few red and white plain, and moulded ones, in bands, arches, and cornices, and some Bath stones, in windows, doors, and fireplaces. The roofs are covered with slates, and finished with ornamental buff tile crests. Inside they open to the ridge, stained and varnished, and plastered between the rafters. The lighting is prettily effected by pendent gas stars, from the centres of each pair of arched principals. Webb's encaustic tiles are used to floor the porches and hearths, and the grates have been provided and fixed by Mr. Penfold. The sanitary, warming, and ventilating, arrangements have had consideration, and the desks in the largest school-room will be "reversible," with hinged seats, to allow of a free passage, while in the smaller room they will be those with enclosed shelves below, divided off for each boy. The playground will be covered with tar pavement, provided with gymnasium, and enclosed with dwarf wall and railing. These schools having been carried out for only 4*l.* 10*s.* per child (exclusive of a special extra item of foundations, caused by building over ground excavated by the Metropolitan District Railway), are amongst the cheapest that have been erected in London as yet. The architect was Mr. E. H. Lingen Barker, and the contractors were Messrs. Thom & Co.

Books Received.

Ecclesiastical Antiquities of London and its Suburbs. By Alexander Wood, M.A. London: Burns & Oates.

When one finds on the title-page,—

> "O, who the ruine sees, whom wonder doth not fill
> With our great fathers' pompe, devotion, and their skill;"

and that in the preface the book is presented "to the reader as architectural and antiquarian only," a little more architectural matter might be expected, and, we might add, a little more architectural knowledge too. Mr. Wood is scarcely posted up in modern researches either, or he would not say "There is a tomb of a boy-bishop at Salisbury," that legend having been destroyed some years ago. Nevertheless, it is a very pleasant and readable book so far as it goes.

The City of London Directory for 1874. W. H. & L. Collingridge, Aldersgate-street.

Messrs. Collingridge improve their Directory year by year, and have rendered it indispensable to a large number of persons. The present issue includes a large map of the City proper, which would be clearer if it were coloured on a different principle.

A Dictionary of Artists of the English School. By Samuel Redgrave. London: Longmans, Green, & Co. 1874.

Mr. Samuel Redgrave has had much to do with art and artists for many years past, and is well qualified for the task he undertook. He claims in his preface, and with some reason, that "the present work appears to be the first to combine, in a dictionary form, some account of the artists of the English school exclusively, and to include the painters, sculptors, architects, engravers, and ornamentists;" and, he adds, "the number who have been thought deserving a place is probably ten times greater than will be found in any other work."

The book is a valuable one, and will be made more so in succeeding editions. So difficult it is to obtain accuracy in such a work in the first instance, that, dipping promiscuously into the Dictionary, we found an error under each of the first six heads looked at. For example, Joseph *Gandy* "did not" make the drawings for Britton's architectural publications (he made very few of them); Francis *Goodwin* was not the architect of Hungerford Bridge (Bunning); nor was Captain Brown the engineer, but I. K. Brunel; the *Hakewills*, of whom seven are mentioned, did not spell the name Hakewell; *Sir W. Tite* was not the architect of the Woking Cemetery (but Mr. S. Smirke); and so on.

Nevertheless, we are very much obliged to Mr. Samuel Redgrave for his book.

VARIORUM.

Mr. C. F. Audley has done good service in translating "Count Montalembert's Letters to a Schoolfellow, 1827–30." * They are remarkable productions by one then little more than a schoolboy, and in these days of sneer and frivolity should recall a few readers to thought and work. We agree with the translator that "they do credit to human nature, and, as such, ought to be held out as a stimulus to the rising generations of every nation,"—always remembering the Church to which the writer belonged.—— Canon Kingsley, in *Good Words*, refers to the true remedy against Drunkenness. "I said just now that a probable cause of increasing drunkenness was the increasing material prosperity of thousands who knew no recreation beyond low animal pleasure. If I am right—and I believe that I am right—I must urge on those who wish drunkenness to decrease, the necessity of providing more and more refined recreation for the people. Men drink, and women too, remember, not merely to supply exhaustion; not merely to drive away care; but often simply to drive away dulness. They have nothing to do save to think over what they have done in the day, or what they expect to do to-morrow; and they escape from that dreary round of business thought in liquor or narcotic. There are still those, by no means of the hand-working class, but absorbed all day by business, who drink heavily at night in their own comfortable homes, simply to recreate their over-burdened minds. Such cases, doubtless, are far less common than they were fifty years ago; but why? Is not the decrease of drinking among the richer classes certainly due to the increased refinement and variety of their tastes and occupations? In cultivating the æsthetic of man's nature; in engaging him with the beautiful, the pure, the wonderful, the truly natural; in painting, poetry, music, horticulture, physical science—in all this lies recreation in the true and literal sense of the word, namely, the recreating and mending of the exhausted mind and feelings, such as no rational man will now neglect, either for himself, his children, or his workpeople. But how little of all this is open to the masses, all should know but too well. How little opportunity the average hand-worker, or his wife, has of eating of any tree of knowledge, save of the very basest kind, is but too palpable. We are mending, thank God, in this respect. Free libraries and museums have sprung up of late in other cities besides London. God's blessing rest upon them all. And the Crystal Palace, and still later, the Bethnal-green Museum, have been, I believe, of far more use than many average sermons and lectures from many average orators."——"Debrett's Peerage, Baronetage, Knightage, and Titles of Courtesy, of the United Kingdom of Great Britain and Ireland" (Dean & Son, St. Dunstan's-buildings, Fleet-street), is too well known as long a standard work to need any special recommendation from us. It is edited by Robert H. Mair, LL.D., and G. Harrison, Windsor Herald, and is under direct personal and annual revision and correction. There is much information respecting the immediate family connexions of the peers, &c., added to the main subjects of the work. It also contains biographical details, and amongst its other information, particulars as to the younger branches of the families of the peers and baronets, and the addresses of widows. The work is said to contain in all upwards of 100,000 facts respecting the nobility of this country and their immediate connexions; while the annual alterations number upon an average upwards of 16,000. It is notable, we may add, in respect to the number of the children of peers and baronets, that in the preface of the work under notice, it is stated that the number of these children was singularly small during the past year; but the number of marriages recorded among the younger scions of the nobility were also far below the average. That the poorer classes, at any time, are much more prolific than the upper, or at

* London: Burns & Oates. 1874.

least the more ancient families of the upper, is well known, and that without the infusion of fresh blood from beneath,—that is, from new families among the upper classes,—our ancient race of nobles would actually soon become extinct. It seems, indeed, to be a law of nature that where animal life is maintained under difficulties, as respects food, &c., and where the life of the individual is thus curtailed, the perpetuity of the species at least is secured by an increase of progeny; and it would seem that where the security of the individual is ensured by abundance of means, the species incurs the liability of diminution or extinction. How does this law bear upon the Darwinian principle of favourable circumstances securing the perpetuity of the species? It certainly seems as if the welfare of the individual and the perpetuity of the species bear an inverse ratio to each other. Sheep, it is said, when half-starved, become exceedingly prolific. Human beings who are consumptive are well known to be more than usually prolific, and the symptoms of the disease will even be greatly diminished for the time in child-bearing, to be afterwards, perhaps, increased in an accelerated ratio.

Miscellanea.

The New Thoroughfare.—The Metropolitan Board of Works, under the powers conferred on them by the Metropolitan Streets Improvement Act, 1871, are proceeding with the settlement of compensation claims preferred by owners and occupiers of property required to be demolished for the purpose of constructing the new street from east to west. Hitherto London has lacked a direct thoroughfare from east to west, and *vice versâ*. This want the Metropolitan Board are about to supply, but the commencement of practical operations is, of course, impeded by the settlement of compensation claims. The new street will be formed in a direct line from Vernon-place, Bloomsbury, to Shoreditch. On Wednesday Mr. Penfold was engaged as umpire, appointed under the Lands Consolidation Act, in arbitrating upon the claim of Mr. Gates, a furniture-dealer, of Curtain-road, Shoreditch, who sought compensation in respect of his compulsory dislodgment, consequent upon the construction of the new street. He claimed about 3,000*l.* damages. Mr. Philbrick was counsel for the Metropolitan Board of Works, and Mr. Horatio Lloyd, instructed by Mr. James Boulton, solicitor, of Northampton-square, Clerkenwell, appeared for the claimant. After an investigation of the facts, the umpire took time to consider his decision.

The Unwholesomeness of Cast-iron Stoves.—MM. Morin, Payen, Deville, Bernard, Bussey, and Rémy, have been commissioned by the French Academy to investigate this subject. Experiments were instituted with stoves of cast and wrought-iron, using soft coals, with the view of learning under what condition stoves of metal become unhealthy, through the presence of carbonic acid and carbonic oxide, in the rooms heated by them. Rabbits were made to breathe the air passing over stoves of cast and wrought iron heated to redness, and afterwards chemical examination of the blood of the animals was made, to ascertain the presence of carbonic oxide. The following words are used in giving the results of the experiments:—"If the summary of the experiments made upon rabbits does not permit us to fix with any precision the proportions of carbonic oxide absorbed by their blood, nor that of the oxygen which has been expelled from it, the results all agree to show that the use of stoves of cast-iron, heated to a red heat, causes, in the blood, by the presence of carbonic oxide, a gas eminently poisonous, changes whose repetition may become dangerous; while the same method of investigation has not revealed analogous effects when the heat has been produced from stoves of wrought or sheet iron."

Railway Matters.—The report of the Metropolitan District Railway Company is again looked upon as unsatisfactory, the slight increase of 2,294*l.* in the receipts having been concurrent with an increase of 11,550*l.* in working expenses. To meet all charges the revenue is deficient to the extent of 9,177*l.* The directors point to the oppressive and invidious character of the passenger duty as one of the chief among adverse influences, but say nothing on the consequences of the non-amalgamation of the line with the Metropolitan.

Indian Art.—At the meeting of the Indian section of the Society of Arts last week, a paper was read by Dr. Zerffi entitled "Indian Art." The chair was occupied by Major-General Sir Vincent Eyre, C.B. Dr. Zerffi, in his paper, gave a minute account of the progress of art in India, which he traced from the earliest symbols, representing fire, water, and air, and to which he attributed the introduction and worship of a triple-headed god. The stupendous religious temples existing were so many evidences of the earliest style of art, and were in themselves tokens of the painstaking and wonderful care then bestowed, although very often on a grotesque or incorrect principle. The Indian mind required total reformation from an artistic point of view, as talent was there dormant, and only required proper instruction to bring it into exercise. In one description of decorative art the Indian was not to be excelled, and that was in the colouring or ornamentation of plain surfaces and in work where his taste in the selection and juxtaposition of colour could be used. All efforts made towards the elevation of art in India could not fail to ennoble the innate taste possessed by the natives, and would also have an influence in reformation in a moral and religious direction. A discussion followed the reading of the paper.

A Relic of Ancient Bristol.—Many who have traversed St. Michael's-hill, Perry-road, and Colston-street, during the past few weeks, says a correspondent of the *Bristol Times*, have doubtless noticed an octagonal tower which is being pulled down. It stands on the south side of the junction of the above-named streets on a shelf of the hill, and from a height of nearly 200 ft. looks down upon Lewin's-mead, and the covered course of the ancient river Frome. This tower is a relic of the old White Lodge, which may be seen depicted in Millerd's large map of Bristol, A.D. 1673. Therein it is drawn as a house of considerable size, with turrets at each angle of its southern front (the one shown in the picture). Built early in the sixteenth century, it stood upon the site, in all probability, of the North Lodge of the grounds and gardens of the Bartholomew Hospital, a religious edifice, whose southern arched entrance in Christmas-street, close by the steps, is an antiquarian gem of the city of Bristol.

Swimming Baths on the Thames.—A capital of 100,000*l.* is required by the Floating Swimming Baths Company, of which 50,000*l.* are now issued in shares of 2*l.* each,—payable, 5*s.* on application, 5*s.* fourteen days after, and 1*l.* a month after allotment. Of this amount 12,500*l.* have already been allotted. It is intended to establish the baths on the Thames, with convenience of place and safety from accident, and the directors expect to have the first bath at Charing-cross ready for opening at the end of June. The sanction of the Thames Conservancy and the Metropolitan Board of Works has been obtained for a site on the river, close to the Charing-cross station, in the position now occupied by one of the landing-stages at Hungerford Bridge; and the sanction of the Thames Conservancy and of the Office of Works has been obtained for another site on the Thames, off the Embankment, near Pimlico pier.

The Leicester Patent Brick and Tile Company.—The workmen and others connected with this company have dined together at the Blue Boar, Southgate-street. The chair was occupied by Mr. Alleyne Bosworth. Mr. G. F. Harrison, in proposing the toast of "The Directors of the Company," said he had the honour of filling the office of secretary. The company was started with a double object. It was started with the motive and intention of benefiting the town of Leicester by providing it with a superior quality of bricks and tiles, and so forth; and it was also for the purpose of producing honest employment for respectable men at remunerative wages, which would be beneficial to them and their families, and to the directors. In this business the directors had embarked a large capital. He was afraid it had not been going on so rapidly as it should, but now they thought they were in the right way for a successful and prosperous business.

District Surveyors.—At the meeting of the Board of Works on Friday, 6th, an application was received from a district surveyor, requesting that a deputy might be appointed in his stead for three months. It having been discovered that the surveyor wished for leave of absence in order to transact some business on his own account in Egypt, the application was refused.

Gift of a Free Library to Macclesfield.—At the last quarterly meeting of the Macclesfield Town Council, the mayor read an offer in writing by Mr. David Chadwick, the junior member for the borough, to build and furnish a free library for the town, at a cost of 5,000*l.*, and to provide about 10,000 volumes as a commencement. The building and contents he proposed to vest in the corporation. He asked the mayor to consult the council as to whether they would be prepared to obtain the authority given by the Free Libraries Act to maintain the building. The council unanimously accepted the offer, and passed a resolution authorising the mayor to convene a public meeting to consider the adoption of the Free Libraries Act.

Improved Industrial Dwellings Company.—The Directors of the Improved Industrial Dwellings Company (Limited), which was founded in the year 1863, and is still presided over by Sir Sydney Waterlow, bart., have just issued their half-yearly report and balance-sheet to the 31st of December, 1873, and from it we gather that the total expenditure on capital account has reached 256,973*l.*, and that 1,577 dwellings have been erected. The profit for the half-year was 6,166*l.* 8*s.* 3d., and after carrying the proper contributions to the leasehold, redemption, and repairs funds, and adding 2,500*l.* to the reserve fund for equalising dividends, the directors recommend the payment of the usual dividend at the rate of 5 per cent. per annum.

"Howard Medal."—The council of the Statistical Society have given effect to the suggestions of the president, Dr. Guy, F.R.S., by founding a medal, under the above title, to be presented, in the name of the society, to the author of the best essay on some subject in "Social Statistics," a preference being given to those topics which Howard himself investigated, and illustrated by his labours and writings. The title of the essay to which the medal will be awarded in November next is as follows:—"The State of Prisons, and the Condition and Treatment of Prisoners in the Prisons of England and Wales, during the last Half of the Eighteenth Century, as set forth in Howard's 'State of Prisons' and work on 'Lazarettos.'"

The Sewage Farm at Northampton.—A report on this subject was read at the last meeting of the local Improvement Commissioners. It stated that the committee were much gratified at the progress which has been made in the different works. The main culverting is all completed. The drainage, too, as far as the mains are concerned, is complete. No more will be done for the present, or until a necessity for doing it is developed by the use of the sewage on the crops. The committee have considered the advisability of planting a small experimental plot of osiers, which, if they can be grown well in sewage, would be sure to prove a profitable crop. The report was adopted.

The Persian Concession.—Baron Reuter has published a letter in reply to some recent statements respecting the Persian concession. He says that the railway works were commenced six weeks before the date stipulated in the convention; that the Persian Minister of Works, in a letter dated September 11th last, expressed the satisfaction of the Shah at the commencement of the undertaking, and promised to afford all the assistance that might be found necessary; and that the railway works have since been proceeded with without interruption. Baron Reuter's latest advices, by telegraph from Teheran, lead him to anticipate a satisfactory understanding.

Accident at Pere-Lachaise Cemetery.—The tunnel by which the circular railway passes under the cemetery of Père-Lachaise, Paris, has for some time past caused uneasiness, as portions of the arch occasionally fell. The vault was carefully shored up, leaving only a passage for the trains carrying goods; but the insecurity was so evident that all traffic had at last to be suspended. Active measures were at once taken to restore the work, but on Saturday night a slip occurred, and the crown of the vault fell in with a tremendous crash, carrying with it some forty graves, and an extent of ground about twenty yards long, ten wide, and eighteen deep.

London and County Banking Company.—An advertisement in our columns shows that the directors of this company have again declared a dividend of 10 per cent. for the half-year. The account, as stated in the advertisement, deals with millions.

Presentation of Bells for the Southport New Townhall.—The erection of the new townhall at Southport, which is to be called the Cambridge Hall, in commemoration of the Princess Mary having laid the foundation stone, is fast advancing towards completion. The building is to have a lofty tower, and Mr. W. Atkinson, a resident in the town, has just presented a large new bell for the clock, the cost of the bell being 450*l*. Mr. Atkinson has also, in addition, offered to give four bells for chimes in the tower.

Yorkshire School of Cookery.—The arrangements have been completed for the establishment of a Leeds branch of the Yorkshire School of Cookery. Mr. S. Jefferson, F.C.S., will explain the *modus operandi*, while the manipulation of the several dishes will be performed by experienced cooks. Middle-class cookery will be the subject of afternoon lectures, and cookery for the working-classes will be illustrated in the evening. The charge for admission to the lectures is merely nominal. A course of twelve will be given in the old Bankruptcy Court.

Caerleon Church, near Newport (Mon.). The fine old church at Caerleon has recently been re-opened after a restoration from the designs of Mr. J. P. Seddon, architect. The old internal roof has been removed, and a panelled one with bosses and centre-pieces at the intersections substituted. The work has been carried out by Mr. Jenkins, of Caerleon, and the carvings have been executed by Mr. Henry C. Frith, sculptor, of this city.

The Excavations in the Coliseum at Rome are continuing regularly, and the removal of two of the stations of the Via Crucis has already been effected. It has been decided that marble slabs shall be placed in the best-preserved arched corridors, with the names sculptured on them of the Christian martyrs who gave up their lives for their faith in the Coliseum.

Cambridge Art Exhibition.—The closing ceremony of the Industrial and Art Exhibition at Cambridge took place on Monday night, the exhibition being an entire success. The mayor presided. The Rev. Henry Jolly and Mr. Edmond Beales spoke, the latter on the vexed question of the relations between labour and capital, which such exhibitions tended to improve.

Drawings of the Elevation of the New Joint Bristol Railway Station have been exhibited in the Commercial-rooms and other places in Bristol. The building will consist of a central tower, with three entrances underneath, and two wings, in exact uniformity.

Art in Japan.—Dr. Dresser writes,—It may interest your readers to know that the paper on Eastern art which I delivered before the Society of Arts on the 4th inst. is being translated into Japanese, with a view to its publication in Japan.

TENDERS

For schools and residence at Caterham Valley, Surrey, for the Caterham School Board. Mr. Richard Martin, architect. Quantities supplied by Mr. Fredk. Sparrow:—

Langmead & Way	£1,818 0 0
Turner & Son	1,797 0 0
Thompson	1,528 0 0
Hearle	1,444 0 0
Hyde	1,398 0 0
Peskett & Taylor	1,375 0 0
Jarrett	1,344 0 0
Ward	1,312 0 0

For house at Watford. Messrs. Smith & Austin, Hertford, architects. Quantities supplied by Mr. R. Carpenter, Reading:—

Cochell & Co.	£700 0 0
Foreman	675 0 0
Jopling & Co.	660 0 0
Chinnock	650 0 0
Clifford & Gough	633 0 0
Allen	632 0 0
G. & J. Waterman (accepted)	608 0 0
Andrews & Son	607 0 0
Bulford	596 0 0

For Messrs. S. Smith & Co.'s bank, Nottingham. Mr. George R. Isborn, architect. Quantities supplied:—

J. & E. Wood	£23,889 15 0
Thompson	23,850 0 0
Hind	23,575 0 0
Dennett	23,500 0 0
Jones & Son	23,390 0 0
Johnson	23,150 0 0

For rebuilding the Market Coffee House, York-street, Borough Market. Mr. E. C. Wade, architect:—

Woodward	£1,457 0 0
Thompson	1,440 0 0
Falkner	1,243 0 0
Baguley (accepted)	1,145 0 0

For erecting dwelling-house, warehouse, and stabling, in Whitecross-street, Cripplegate Without:—

Larke	£2,194 0 0
Sewell & Son	2,150 0 0
Perry Brothers	2,107 0 0
Auley	1,998 0 0
Pocock	1,987 0 0
Turner & Sons	1,933 0 0

For new stables, Messrs. Chubb's factory, Glengall-road. Mr. Elijah Hoole, architect:—

Boden	£564 0 0
Kitson & Son	560 0 0
Shurmur	558 0 0
Hobson	557 0 0
Haydon	520 0 0
Kitchener (accepted)	440 0 0

For erection of Congregational church and vestries at New England-road, Brighton. Messrs. Goulty & Gibbins, architects:—

	Chapel and Vestries.	Boundary Walls and Drainage.	Gallery.
Child	£1,965	£165 0	£225 0
Lockyer	1,851	186 0	287 0
Lynn & Sons	1,810	180 0	280 0
Cheesman & Co.	1,796	175 0	274 0
Nash & Co.	1,829	174 0	219 0
Patching & Webber	1,725	167 0	218 0
W. & T. Garratt	1,550	162 10	182 16
Barnes (accepted)	1,500	145 0	190 0

For the erection of a villa residence at Queen's Park, Brighton, for Mr. George Duddell. Mr. Lewis H. Isaacs, architect. Quantities supplied by Mr. Riddett:—

Marshall	£4,480 0 0
Chappell	3,883 0 0
Lynn & Son	3,870 0 0
Lockyer	3,700 0 0
Bruton	3,500 0 0

For erection of buildings for the London Fire Salvage Corps, in Commercial-road, Middlesex. Mr. J. Wimble, architect. Quantities supplied by Mr. W. Wimble:—

Faulkner	£4,949 0 0
Noxon & Sons	4,893 0 0
Lawrence	4,794 0 0
Newman & Mann	4,786 0 0
Grove	4,693 0 0
Coleman	4,650 0 0
Ennor	4,579 0 0
Outhwaite & Son	4,494 0 0
Killby	4,482 0 0
Mortar	4,219 0 0

For enlargement of brewery at Burton-on-Trent, for Messrs. Truman, Hanbury, Buxton, & Co. Mr. Geo. Scamell, architect. Quantities supplied by Messrs. R. L. Curtis & Sons. Contract No. 8:—

Low	£24,560 0 0
Brown (accepted)	24,242 0 0

For finishing two villa residences on the Torrington Park Estate, Finchley. Mr. Thomas Clarke, architect:—

Upson & Kidsdale	£626 12 0
Dunsford	564 0 0
Vollett & Till	512 0 0
Pearce	499 0 0
Draper & Priest	450 0 0
Mildwater	428 0 0
Welch	420 0 0
Webster	400 0 0
Groom	400 0 0
Hunting	355 10 0
Francis & Sons	285 0 0

For superstructure of a new warehouse in Aldgate, City, for Messrs. Zimmerman & Co. Mr. John Wimble, architect. Quantities supplied by Mr. W. Wimble:—

Adamson	£11,513 0 0
M'Lachlan	11,496 0 0
Brass	11,470 0 0
Ashby & Horner	11,310 0 0
Lawrence	11,290 0 0
Scrivener & White	11,230 0 0
Dove, Bros.	11,170 0 0
Killby	11,150 0 0
Newman & Mann	10,986 0 0
Mortar	8,893 0 0

For works in finishing upper floors, Inns of Court Hotel. Messrs. Bateman & Corser, architects. Quantities by Messrs. Balstone & Hunt:—

Simpson & Baker	£4,795 0 0
Manley & Rogers	4,755 0 0
Waldram & Co.	4,710 0 0
Longmire & Burge	4,647 0 0

For coach-house, stabling, &c., at Trainlands, Beckenham, Kent, for the Rev. Charles Dent. Mr. T. Dinwiddy, architect:—

Downs & Co.	£1,026 0 0
Nightingale (accepted)	966 0 0

For reseating and repairing parish church, East Grinstead. Mr. John M. Hooker, architect, Sevenoaks. The quantities by Messrs. Northcroft & Son:—

	Nave Seats in Deal, Chancel Seats Oak.	Nave Seats and Chancel Seats all Oak.	Nave, Aisle, and Chancel Seats all Oak.
Conrath & Son	£1,341 14 2	£2,191 10 2	£3,252 14 8
Taylor & Son	1,126 0 0	1,575 0 0	2,405 0 0
Aldred	992 0 0	1,290 0 0	2,372 0 0
Nightingale	1,060 0 0	1,570 0 0	2,370 0 0
Anscombe	1,128 0 0	1,625 0 0	2,353 0 0
Wright, Bros. & Co.	1,075 0 0	1,535 0 0	2,275 0 0
Perigoe	1,245 18 6	1,620 15 1	2,215 12 5
Cox & Sons	1,355 14 0	1,908 11 0	2,192 0 0
Longley	1,050 0 0	1,510 0 0	2,173 0 0
Jopling & Co.	1,028 0 0	1,470 0 0	2,070 0 0
Charlwood, Brothers	1,095 4 0	1,337 16 0	1,888 10 0
Pink	1,038 19 3	1,324 3 2	1,867 1 7
Cheesman & Son	970 0 0	1,270 0 0	1,841 0 0
Smart	973 15 7	1,282 15 5	1,735 10 6
Barnes	950 0 0	1,160 0 0	1,730 0 0
Morris	870 0 0	1,150 0 0	1,620 0 0
Chinnock	—	—	1,500 0 0
Stear	700 0 0	800 0 0	1,435 0 0
Godly	350 0 0	550 0 0	1,350 0 0

For repairs and extension of shop, No. 464, Edgware-road, for Mr. Wright. Mr. William Ward, architect:—

Gill	£475 0 0
French	463 0 0
Harris & Sons	438 0 0
Cross & Son	435 0 0
Green	425 0 0
Mark	399 0 0
Garrod & Smith	394 0 0

For erection of shop at the Higher Market, Queen-street, Exeter, for Mr. Howard. Mr. Snellgrave, architect:—

Easton	£770 0 0
Sharland	528 0 0
Hunt (accepted)	500 0 0
Gibbard	397 8 0

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We are compelled to decline pointing out books and giving addresses.

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The new and illustrated edition of "The Dwellings of the Labouring Classes," by HENRY ROBERTS, Esq. F.S.A. (author of "Home Reform," and "The Physical Condition of the Labouring Classes") will be found a summary of the efforts at home and abroad to secure "Healthy Homes" for working men and women.
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CONCRETE BUILDING.—A Gentleman, experienced in the above, and possessed of some small capital, would be glad to hear of an opening, either as MANAGER or to take a Contract.—Address, A. B. 20, King's-road, Bedford-row, W.C.

LONDON and COUNTY BANKING COMPANY. Established in 1836, and incorporated in 1874 under "The Companies Act, 1862."

Subscribed capital, 3,000,000*l.* in 60,000 Shares of 50*l.* each.

Paid-up capital	£1,199,890	£1,200,000
Instalments unpaid	110	
Reserve Fund (paid up)	599,945	£600,000
Instalments unpaid	55	

DIRECTORS.

Nathaniel Alexander, esq.	Edward Harbord Lushington, esq.
Thomas Tyringham Bernard, esq.	James Morley, esq.
Thomas Stock Cowie, esq.	William Nicol, esq.
Frederick Francis, esq.	Abraham Hodgson Phillpotts, esq.
Frederick Harrison, esq.	James Duncan Thomson, esq.
William Champion Jones, esq.	Frederick Youle, esq.

Joint General Managers—William McKewan, Esq. and Whitbread Tomson, Esq.
Chief Inspector—W. J. Norfolk, esq.
Chief Accountant—James Gray, esq.
Secretary—George Gough, esq.
Head Office—21, Lombard-street.
Manager—Whitbread Tomson, esq.
Assistant Manager—William Howard, esq.

At the Annual General Meeting of the Proprietors, held on Thursday, Feb. 5, 1874, at the City Terminus Hotel, Cannon-street Station, the following report for the half-year ending the 31st December, 1873, was read by the Secretary; Frederick Francis, esq. in the chair:—

"The Directors, in submitting to the Proprietors the balance-sheet of the bank for the half-year ended on 31st December last, have the pleasure to report that after paying interest to customers, and all charges, allowing for rebate, and making provision for bad and doubtful debts, the net profits amount to 148,706*l.* 2s. 6d. This sum, added to 20,189*l.* 10s. 9d. brought from the last account, produces a total of 168,895*l.* 13s. 3d.

"In view of supplying additional accommodation to meet the increasing requirements of the business of the Bank, the directors have transferred 25,000*l.* to the credit of the premises account.

"The Directors recommend the payment of a dividend of 10 per cent. for the half-year, free of income-tax, which will absorb 119,978*l.*; and that the balance of 23,917*l.* 13s. 3d. that will then remain, be carried forward to profit and loss new account.

"The present dividend, added to that paid to 30th June, will make 20 per cent. for the year 1873.

"The Directors announce with regret the death of William Jardine, Esq. one of the auditors of the Bank. The vacancy thus arising it is in the power of the meeting to fill up.

"The Directors retiring by rotation are: Thomas Stock Cowie, Esq. Frederick Francis, Esq. and Frederick Harrison, Esq.; who, being eligible, offer themselves for re-election.

"In consequence of the continued increase in the business of the Company, the Directors recommend that the 15,000 shares already authorised at previous meetings to be issued, be offered rateably amongst the proprietors whose names shall appear on the share-register of the Company on 31st March next, such shares to be issued at 30*l.* each, being a premium of 10*l.* per share. A resolution to this effect will be submitted to the meeting.

"Acting on the resolution of the proprietors passed at the last half-yearly meeting, and confirmed at an extraordinary meeting held on 21st August, the Directors have effected the registration of this Company under "The Companies Act, 1862," and the Bank is now a corporation, having perpetual succession and a common seal.

"The dividend, amounting to 2*l.* per share, free of income-tax, will be payable at the Head Office, or at any of the branches, on or after MONDAY, the 16th instant."

BALANCE SHEET OF THE LONDON AND COUNTY BANKING COMPANY, 31st DECEMBER, 1873.

Dr.			
To capital	£1,200,000 0 0		
To instalments unpaid.....	110 0 0		
		£1,199,890	0 0
To reserve fund	600,000 0 0		
To instalments unpaid	55 0 0		
		599,945	0 0
To amount due by the Bank for customers' balances, &c.....	18,077,868 18 4		
To liabilities on acceptances, covered by securities	4,070,306 4 4		
		22,148,175	2 8
To profit and loss balance brought from last account.....	20,189 10 9		
To gross profit for the half-year after making provision for bad and doubtful debts.....	438,874 10 4		
	459,064 1 1		
Less amount transferred to premises account	25,000 0 0		
		434,064	1 1
		£24,382,074	3 9
Cr.			
By cash on hand at head office and branches, and with Bank of England.....	£2,552,320 16 0		
By cash placed at call and at notice, covered by securities ..	2,656,494 16 11		
		£5,208,815	13 8
Investments, viz.:—			
By Government and Guaranteed Stocks.....	1,711,250 6 9		
By other stocks and securities ..	105,996 18 3		
		1,817,246	5 0
By discounted bills and advances to customers in town and country	12,764,647 14 4		
By liabilities of customers for drafts accepted by the Bank (as per contra).....	4,070,306 4 4		
		16,834,953	18 8
By freehold premises in Lombard-street and Nicholas-lane, freehold and leasehold property at the branches, with fixtures and fittings	306,169 9 1		
Less amount transferred from profit and loss	25,000 0 0		
		281,169	9 1
By interest paid to customers....		122,030	4 0
Salaries and all other expenses at head office and branches, including income-tax on profits and salaries		117,858	13 4
		£24,382,064	3 9

PROFIT AND LOSS ACCOUNT.

Dr.		
To interest paid to customers, as above.....	£122,030	4 0
To expenses: ..... ditto	117,858	13 4
To rebate on bills not due, carried to new account	50,279	10 6
To dividend of 10 per cent. for half-year	119,978	0 0
Transferred to the credit of premises account	25,000	0 0
To balance carried forward	23,917	13 3
	£459,064	1 1
Cr.		
By balance brought forward from last account	£20,189	10 9
By gross profit for the half-year, after making provision for bad and doubtful debts.....	438,874	10 4
	£459,064	1 1

We, the undersigned, have examined the foregoing balance-sheet, and have found the same to be correct.

(Signed) WILLIAM NORMAN, RICHARD H. SWAINE, } Auditors.

London and County Bank, 29th January, 1874.

The foregoing report having been read by the Secretary, the following resolutions were proposed and unanimously adopted:

1. That the report be received and adopted, and printed for the use of the shareholders.

2. That a dividend of 10 per cent., free of income-tax, be declared for the half-year ended the 31st December, 1873, payable on and after Monday, the 16th instant, and that the balance of £23,917 13s. 3d. be carried forward to Profit and Loss New Account.

3. That the 15,000 shares in the share capital of the Company already authorised be offered rateably amongst the proprietors who shall appear registered in the books of the Company on the 31st March next, such shares to be issued at a premium of £10 per share, and on the following terms and conditions:—

(1) That payments be made as follow;

£7 10s.	per share on the	1st June,	1874.
7 10s.	"	1st December,	1874.
7 10s.	"	1st June,	1875.
7 10s.	"	1st December,	1875.

(2) That 5*l.* of each payment shall be on account of capital, and the remaining 2*l.* 10s. of each payment shall be taken on account of the premium and added to the reserve fund.

(3) That such payments, both on account of capital and of premium shall bear interest after the rate of 5 per cent. per annum until the 31st December, 1875, payable as hereinafter mentioned, from which date the payments on account of capital only shall be entitled to receive dividends after the same rate as the other capital stock of the Company.

(4) That instalments in arrear shall be charged with interest at the rate of 10 per cent. per annum, to be paid with such instalments.

(5) That any instalment paid in anticipation shall not be entitled to interest until the date when such instalment becomes payable.

(6) That the holder of scrip certificates (the instalments due thereon having been paid) shall be entitled to receive in respect of each share—on the 1st March, 1875, the sum of 5s. and on the 1st March, 1876, the sum of 1*l.*—being interest at the rate of 5 per cent. per annum.

(7) That on the 1st March, 1876, the scrip certificates (all payments thereon having been made) shall be brought in for registration, when a certificate for the relative number of shares shall be given in exchange, in favour of the person whose name in full, quality, and address shall be subscribed upon them, on the same being lodged at the London and County Bank, 21, Lombard-street, and the deed of settlement of the Company being signed.

4. That Thomas Stock Cowie, Frederick Francis, and Frederick Harrison, esqrs. be re-elected Directors of this Company.

5. That William Norman, Richard Hinds Swaine, and Stephen Symonds, esqrs. be elected auditors for the current year, and that the thanks of this meeting be presented to the two former for their services during the past year.

6. That the thanks of this meeting be given to the Board of Directors for the able manner in which they have conducted the affairs of the Company.

7. That the thanks of this meeting be presented to the General Managers, and to all the other Officers of the Bank, for the zeal and ability with which they have discharged their respective duties.

(Signed) FREDERICK FRANCIS, Chairman.

The Chairman having quitted the chair, it was resolved, and carried unanimously—

8. That the thanks of this meeting be presented to Frederick Francis, esq. for presiding on the present occasion.

(Signed)
WILLIAM CHAMPION JONES, Deputy-Chairman.

Extracted from the minutes.
(Signed) GEORGE GOUGH, Secretary.

LONDON and COUNTY BANKING COMPANY.—Notice is hereby given, that a DIVIDEND on the Capital of the Company, at the rate of 10 per cent. for the half-year ended 31st December, 1873, will be PAID to the proprietors, either at the Head Office, 21, Lombard-street, or at any of the Company's Branches, on or after MONDAY, the 16th instant. By order of the Board,
W. M'KEWAN, } Joint General
WHITBREAD TOMSON, } Managers.
No. 21, Lombard-street, February 6, 1874.

IMPERIAL FIRE INSURANCE COMPANY. Established 1803.
1, Old Broad-street, E.C. and 16 & 17, Pall-mall, S.W.
Capital, 1,600,000*l.* Paid up and invested, 700,000*l.*
E. COZENS SMITH, General Manager.

CLERICAL, MEDICAL, and GENERAL LIFE ASSURANCE SOCIETY.
13, St. James's-square, London, S.W.
City Branch: Mansion House-buildings, E.C.
FINANCIAL RESULTS.

The Annual Income, steadily increasing, exceeds	£249,000
The Insurance Fund, safely invested, is over.....	1,880,000
The new Policies in the last Year were 457, assuring	294,457
The New Annual Premiums were	9,770
The Bonus added to Policies in January, 1872, was.....	323,871
The Total Claims by Death paid amount to.....	3,169,691
The subsisting Assurances and Bonuses amount to	5,773,144

DISTINCTIVE FEATURES.
Credit of Half the first Five Annual Premiums allowed on Whole-term Policies on Healthy Lives not over 60 years of age.
Endowment Assurances granted, without Profits, payable at death or on attaining a specified age.
Invalid Lives Assured at Rates proportioned to the Risk.
Claims Paid Thirty Days after Proof of Death.
REPORT, 1873.
The 49th Annual Report just issued, and the Balance Sheets for the year ending June 30, 1873, as rendered to the Board of Trade, can be obtained at either of the Society's Offices, or of any of its agents.
GEORGE CUTCLIFFE, Actuary and Secretary.

MONEY, TIME, and LIFE are LOST in the event of ACCIDENTAL INJURY or DEATH.
Provide against these Losses by a Policy of the RAILWAY PASSENGERS' ASSURANCE COMPANY against ACCIDENTS of ALL KINDS.
The Oldest and Largest Accidental Assurance Company.
Apply to the Clerks at the Railway Stations, the Local Agents, or No. 64, CORNHILL, and 10, REGENT-STREET, LONDON.
WILLIAM J. VIAN, Secretary.

NATIONAL FREEHOLD LAND SOCIETY.
TRUSTEES.
Charles Gilpin, esq. M.P. Thomas Beggs, Esq
M. M. Monro, esq.
The Directors of this Society are prepared to make ADVANCES on Freehold or Leasehold Properties, repayable by easy instalments.—Further particulars and forms of proposal may be obtained of the Secretary, 14, Moorgate-street, E.C.

BUILDERS' CLERKS' BENEVOLENT INSTITUTION. Founded 1866.
The Committee have the honour to announce that the SEVENTH ANNUAL GENERAL MEETING of the Donors and Subscribers, to receive the Report and Balance-sheet for the past year, and to elect the Officers for the ensuing year, will be held at the Office of the Institution, 27, Farringdon-street, E.C. on TUESDAY, MARCH 3rd.
CHARLES FISH, Esq. (President elect), will take the chair at EIGHT p.m.
After the transaction of the usual business, the meeting will be made special, for the election of Mrs. Finch Spencer to a full widow's pension.
Also to consider a motion by Mr. H. J. BAYES,—
"That the time has arrived when the accumulations of the Orphan Fund should be dealt with, in order that the education of the children of deceased builders' clerks may be undertaken by this Institution."
Also to consider a motion by Mr. ALFRED B. SMITH:—
"To alter Rule 3, Sec. 1, by omitting 'one vote' after the words 'entitled to,' and substituting 'two votes'; and omitting after 'one guinea' 'two votes,' and substituting 'four votes.'"
"To alter Secs. 2, 3, and 4 in the same manner."
"Section '7' to be numbered Section '4.'"
"To make a new Section, numbered '8,' as follows:—'That junior clerks in builders' employment subscribing 5s. 3d. shall be entitled to one vote at all elections.'"
"To alter the numbering of the remaining Section to suit this arrangement."
"Section 8, to insert after 'may be' 'divided or.'"
"Section 9, alter 'one vote' to 'two votes.'"
F. T. MULLETT, Secretary, 27, Farringdon-street, E.C.

WANTED, a CONTRACTOR, to JOIN an ARCHITECT, who has some capital, in Covering a very eligible Building Estate, held on most advantageous terms. Must have a small capital and credit with the tradesmen. An excellent opportunity for a young man who wishes to increase his business, as it would introduce him to a good connexion.—Address, G. C. S. care of Mr. Cope, Post-office, Mare-street, Hackney.

PERSPECTIVES
Rapidly and Artistically PREPARED,
COLOURED, or ETCHED,
for Competitions or Exhibition.
DESIGNS and WORKING DRAWINGS.
Terms Moderate.—Address, T. H. 14, Argyle-street, King's-cross, W.C

PERSPECTIVES DRAWN and COLOURED, by a COMPETENT DRAUGHTSMAN.
Address, W. PRINCE,
51, Dudley-street, Chorlton-road, Manchester.

MR. THOMAS C. NISBET undertakes the preparation of COMPETITION DRAWINGS, including Coloured or Etched Perspectives, at his own residence, or at the offices of Architects, in Town or country. Specimens of etched perspectives in the London Law Courts, and of coloured drawings in the recent leading competitions and Royal Academy exhibitions.—For references of ability, and for terms, which are moderate, address, 2, Windsor-road, Holloway-road, N.

PARTNERSHIP.—Wanted immediately, by a thoroughly energetic and active young Man, a PARTNERSHIP with a Builder and Contractor doing a good business. Not afraid of work.—Apply, stating particulars, to W. 38, Burton-road, Brixton.

TO ARCHITECTS AND SURVEYORS.
PARTNERSHIP.—A Gentleman who has had good professional experience wishes to PURCHASE a PARTNERSHIP or JUNIOR PARTNERSHIP with an ARCHITECT and SURVEYOR.—Address, ARCHITECT, 1, Great Queen-street, Westminster.

PUPIL.—An Architect and Surveyor, with a good general practice, has a VACANCY in his office for a gentlemanly YOUTH as articled PUPIL.—Address, B. H. care of Mr. Vernon, No. 40, Lamb's Conduit-street.

TO PARENTS AND GUARDIANS.
AN ARCHITECT and SURVEYOR has a vacancy for a PUPIL. A small premium required.—Address, A. Y. care of Housekeeper, 8, Abchurch-yard, E.C.

DRAUGHTSMAN.—The SERVICES of a competent DRAUGHTSMAN are REQUIRED by the Corporation of the Borough of Barrow-in-Furness. The person engaged must be a quick and neat writer, and must be able to plot levels and surveys from the field-book.—Application, with copies of testimonials, will be received by the Borough Surveyor, up to the 16th inst. Salary, 80*l.* per annum.—By order,
C. F. PRESTON, Town Clerk.

BOROUGH of WELSHPOOL.—URBAN SANITARY AUTHORITY.—The Corporation of Welshpool Require a Person to fill the Office of BOROUGH SURVEYOR, SURVEYOR of STREETS and HIGHWAYS, and INSPECTOR of NUISANCES, together, with the Charge of Waterworks and Sewerage, in the district, which comprises an area of 20,000 acres (the greater part of which is rural), and a population of 7,300, the town population being 4,500. The appointment will be made in the first instance for one year, from the 25th March, 1874, at a Salary of 150*l.* per annum, including all travelling and other expenses within the borough (except forms, stationery, and postages). The duties will be those prescribed by the Sanitary Act, and such other duties as the Sanitary Authority may from time to time require. The person appointed must have a practical knowledge of surveying and planning, and able to make a sanitary survey of the district, including sewerage system and water supply, and furnish a detailed report on its condition and requirements, and generally to advise the council, and have a practical knowledge of sanitary arrangements. The officer appointed will be required to enter into an agreement and bond, with sureties approved by the Sanitary Authority, for the due performance of the duties of the office, and will be required to devote the whole of his time to those duties. Applications, stating age, with testimonials or copies, which will not be returned, must be delivered to me on or before SATURDAY, the 28th inst.—EDWD. JONES, Town Clerk,
And Clerk to the Urban Sanitary Authority.
Welshpool, 3rd February, 1874.

TOTTENHAM LOCAL BOARD of HEALTH.—An ASSISTANT required in the SURVEYOR'S DEPARTMENT, for a few weeks.—Application, by letter, stating salary, qualifications, &c. to Mr. JOHN A. CLEMENTS, Surveyor, Tottenham, N.

TOWN SURVEY.—The Dalton-in-Furness Local Board require the SERVICES of an ASSISTANT, in the Office of the Town Surveyor. No person need apply who has not had experience in making and plotting town surveys to a large scale.—Applications, stating age and experience, and salary required, will be received by the Town Surveyor, up to the 23rd instant.
FRANCIS HENRY CLARK, Clerk.

TOWN SURVEYOR WANTED.—The West Hartlepool Improvement Commissioners desire immediately to appoint a TOWN SURVEYOR, who will also act as Chief Inspector of Nuisances. Salary, 200*l.* per annum. A statement of duties may be had on application to me, by whom all applications (with recent testimonials) will be received up to noon on the 17th FEBRUARY. Canvassing any of the Board will be considered an absolute disqualification.
WM. W. BRUNTON, Clerk to the Commissioners.
January 28th, 1874.

ASSISTANT SURVEYOR.—The Corporation of the Borough of Barrow-in-Furness require the services of an ASSISTANT in the Office of the Borough Engineer and Surveyor. No person need apply who has not been accustomed to the execution of private improvements, and the apportionment of the expenses of such works. A salary at the rate of 130*l.* per annum, increasing to 180*l.* next year, will be paid. Applications, with copies of testimonials, will be received by the Borough Engineer up to the 16th instant. It is necessary that the gentleman appointed should be a good correspondent, and preference will be given to those who can write short-hand.—By order,
C. F. PRESTON, Town Clerk.

CLERK of WORKS.—Ravensthorpe Main Drainage.—Wanted, a thoroughly efficient CLERK of WORKS, experienced in the construction of Water or Drainage Work. Acquaintance with the use of the spirit level will be a recommendation. Unexceptionable references required. Salary, 2*l.* 10*s.* per week.—Early application by letter, stating age, experience, and reference, to be made to Mr. MALCOLM FATKESON, Civil Engineer, Church-street, Dewsbury.

PRIME-COST CLERK WANTED, immediately, in a large Builder and Contractor's Office in London. Must be thoroughly capable.—Address, stating full particulars, salary, references, &c. to J. PERRY & CO. Tredegar Works, Bow, E.

WANTED.—A thoroughly experienced QUANTITY TAKER and SURVEYOR, not fully engaged, offers his SERVICES on Reasonable Terms.—Address, 903, Office of "The Builder."

WANTED, in a London Office, a GENERAL ASSISTANT. Must be a good Draughtsman, and thoroughly conversant with official routine.—Address, stating terms, age, and reference to ARCHITECT, 13, John-street, Adelphi.

WANTED, Three or Four good GENERAL JOINERS for the Shop-fitting. Constant employment to suitable hands.—Apply to JOHN HILL, 2 to 7, New-cut, Lambeth.

WANTED, in a country Auctioneer and Land Agent's Office, for a permanency, a CLERK, who thoroughly understands land surveying, is a good penman, and is well up in accounts. References required.—Address, stating age, salary required, &c. to E. 124, Ebury-street, Pimlico, S.W.

TO ARCHITECTS' ASSISTANTS.
WANTED, in the Country, a first-class ASSISTANT, well up in design and construction, and who can take the management of an office in the absence of the principal. None but those thoroughly qualified need apply.—Address, with terms and other particulars, 922, Office of "The Builder."

TO DECORATIVE ARTISTS.
WANTED, the ASSISTANCE of a DECORATIVE ARTIST, accustomed to make Coloured Designs for interior decorations of the highest order.—Address, by letter in the first instance, to A. B. Mr. C. Poole's Advertising Offices, Bouverie-street, W.C.

WANTED, a JUNIOR ASSISTANT. He must be a neat and expeditious Draughtsman, accustomed to prepare plans for buildings, &c. from sketches, and acquainted with the routine of a Borough Surveyor's Office. State salary, &c.—Address, 888, Office of "The Builder."

WANTED, FIGURE-PAINTERS; also good FRET GLAZIERS and CUTTERS.—Apply to Messrs. SAUNDERS & CO. Stained Glass Works, 25, Endell-street, W.C.

TO CLERKS OF WORKS.
WANTED, at once, a practical Man, to SUPERINTEND the DRAINAGE and ROAD-WORK on an Estate. Must thoroughly understand levelling.—Address, enclosing copies of testimonials, and stating salary required, and where last employed, to W. ADAMS MURPHY, Architect and Surveyor, 47, Church-street, Camberwell.

WANTED, a MAN thoroughly capable of WORKING a GENERAL JOINER.—Address, stating age, lowest salary required, and full particulars, to 875, Office of "The Builder."

WANTED, in a Builder's Office, a respectable LAD that can WRITE WELL. One who has been in the business before preferred.—Address, J. F. S. 110, Mare-street, Hackney, E.

WANTED, at once, a YOUTH, who can TRACE and COPY PLANS and MAPS neatly and accurately. Address, in own handwriting, A. F. 4, Storey's-gate, St. James's Park.

TO CABINET-MAKERS.
WANTED, immediately, an experienced FOREMAN, for a first-class Shop in the North of England.—Address, stating experience, age, and wages expected, 909, Office of "The Builder."

WANTED, a thoroughly competent SHOP FOREMAN of JOINERS (non-society).—Apply to Messrs. PATRICK & SON, Westminster Bridge-road, S.E.

WANTED, a competent FOREMAN of MASONS, to Take the Lead in the Yard.—State experience, references, and salary, by letter only, to Messrs. NEWMAN & MANN, 216, Upper Thames-street, City, E.C.

WANTED, a good WORKING SHOP FOREMAN of JOINERS.—Must be competent to take charge of the shop, to set out work, and accustomed to machinery.—Apply, stating age, references, and salary required to Messrs. W. H. & J. SLATER, Builders, Derby.

TO PAINTERS.
WANTED, in a City Shop, a WORKING FOREMAN. Constant employment.—Send wages required, how long in last situation, and any further particulars. Those only need apply who have been thoroughly used to the business as a Foreman.—Address, H. H. 22, Wormwood-street, City.

GENERAL FOREMAN WANTED for a JOB, a few miles from London.—State age, wages required, and give reference to leading London builders.—Address, 958, Office of "The Builder."

GLASS PAINTERS and GLAZIERS WANTED.—Apply to Messrs. COX & SONS, Artists in Stained Glass, 29, Southampton-street, Strand.

PRIME COST CLERK WANTED, immediately, in a large Builder's and Contractor's Office, London. Must be thoroughly capable.—Address, stating full particulars, salary, and references, &c. to J. PERRY & CO. Tredegar Works, Bow, E.

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